THE EXPLOSIVES ENGINEER

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Forerunner of Progress in Mining, Quarrying, Construction

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Views and opinions expressed by the authors of articles in this publication are their own, and they do not necessarily represent those of the publisher.

Since 1925, THE EXPLOSIVES ENGINEER has been privileged to present an annual article which summarizes the results of the National Safety Competition, conducted by the Bureau of Mines, U. S. Department of the Interior.

In the article beginning on page 71, Seth T. Reese, Chief of the Accident Analysis Branch of the Bureau, reports that 583 mines and quarries located in 41 states were enrolled in the 1953 contest. The competing units, representing a total of 156,798,125 man-hours of work, made the best overall safety record in the 29-year history of this nation-wide contest. Also, both the injury-severity rate of 4.039 days lost per thousand man-hours of work and the injury-frequency rate of 22.220 days lost per million man-hours were more favorable, by wide margins, than in any other year since the competition began.

Perfect safety records were achieved by 197 mines and quarries. This is the largest number of operations with no lost-time injuries in the history of the contest. Included in the list of no-accident plants last year were: 127 quarries; 39 open-pit mines; 12 nonmetallic mines; 10 anthracite and bituminous-coal mines; and 9 metal mines. These operations represented a total worktime of 17,662,589 man-hours.

On the basis of the 1953 results, it is reasonable to believe that the progress in safety made by the companies enrolled in the competition could be achieved by all comparable mines and quarries if each operating unit concentrated its attention on safety to the same degree and with the same enthusiasm as the enrolled mines and quarries.

The Bureau of Mines, in cooperation with THE EXPLOSIVES ENGINEER, started the National Safety Competition in 1925. During the intervening years, this competition has become a potent influence for the promotion of accident prevention in mines and quarries in the United States. Each year, competing companies launch a mass attack against occupational hazards — an attack that has drawn attention throughout the country to the practicability of extracting minerals from the earth without accidental injury to the men engaged in the work.

Each year, five mines and one quarry, the winners in their respective group classifications, are awarded bronze Sentinels of Safety trophies and green-and-white Sentinels of Safety flags in recognition of outstanding leadership and accomplishment in safety work in the mineral industry. Certificates of Achievement in Safety are awarded to individual employes at each winning plant; to the next four ranking plants after the winner in each of the six groups; and to plants with no lost-time injuries, provided 30,000 or more man-hours are worked.

Any underground mine, open-pit operation, or quarry in the United States is eligible to enter the National Safety Competition. Applications for enrollment and copies of the contest rules may be had by communicating with the Bureau of Mines, U. S. Department of the Interior, Washington 25, D. C.

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Peter Kiewit

PRESIDENT

PETER KIEWIT SONS' CO.

A Biography

As THE president of Peter Kiewit Sons' Co., one of the larger construction organizations, Peter Kiewit has conclusively demonstrated a rare combination of attributes: sound judgment, keen business foresight, unusual technical leadership and inspirational qualities, and a warm appreciation and understanding of his fellowmen. The brilliant leadership of this courageous, but quiet, industrialist during the past twenty years has earned many spectacular assignments for the company he directs; it has also earned for Peter Kiewit the respect and admiration of fellow-contractors all over the world.

"Pete," as he is known to his family and friends, was born in Omaha, Douglas County, Nebraska, September 12, 1900, the son of Peter and Anna Kiewit. His maternal grandparents were brick manufacturers and masonry contractors in Germany; his paternal ancestors were Dutch craftsmen in Holland. In the early 1880's, Grandfather Kiewit migrated to the United States and settled in Keokuk, Iowa, where he established and operated a brickyard. Later, Pete's father moved to Omaha and worked as a bricklayer, a masonry contractor, and, subsequently, a general contractor.

Pete received his formal education at Mason Grade and Central High schools in Omaha. While in grade school, much of his spare time was spent as a water boy, a carpenter's helper, and in doing odd jobs on his father's construction projects. Later, during high school vacation periods, he worked as an apprentice mason.

Following his graduation from high school, Pete matriculated at Dartmouth College, Hanover, New Hampshire. At the end of his freshman year in 1920, he left college and returned to Omaha to work as a foreman for Peter Kiewit Sons' Co. in the building business which had been managed by his two brothers since the death of their father in 1914. In due course, he was advanced to various positions of responsibility in the company, culminating in his being made president in 1931.

Soon after Pete became the directing head of the company he introduced a program of expansion, which included the construction of highways, bridges, dams, tunnels, and companion structures. During the period of transition, he built up the company's key personnel by the employment of engineers and technical specialists, and, at the same time, acquired modern, diversified types of equipment. Today, the record of work done by the Kiewit company since 1931 includes the construction of highways in twenty states, as well as dams, tunnels, airports, power plants, irrigation projects, and buildings of all kinds.

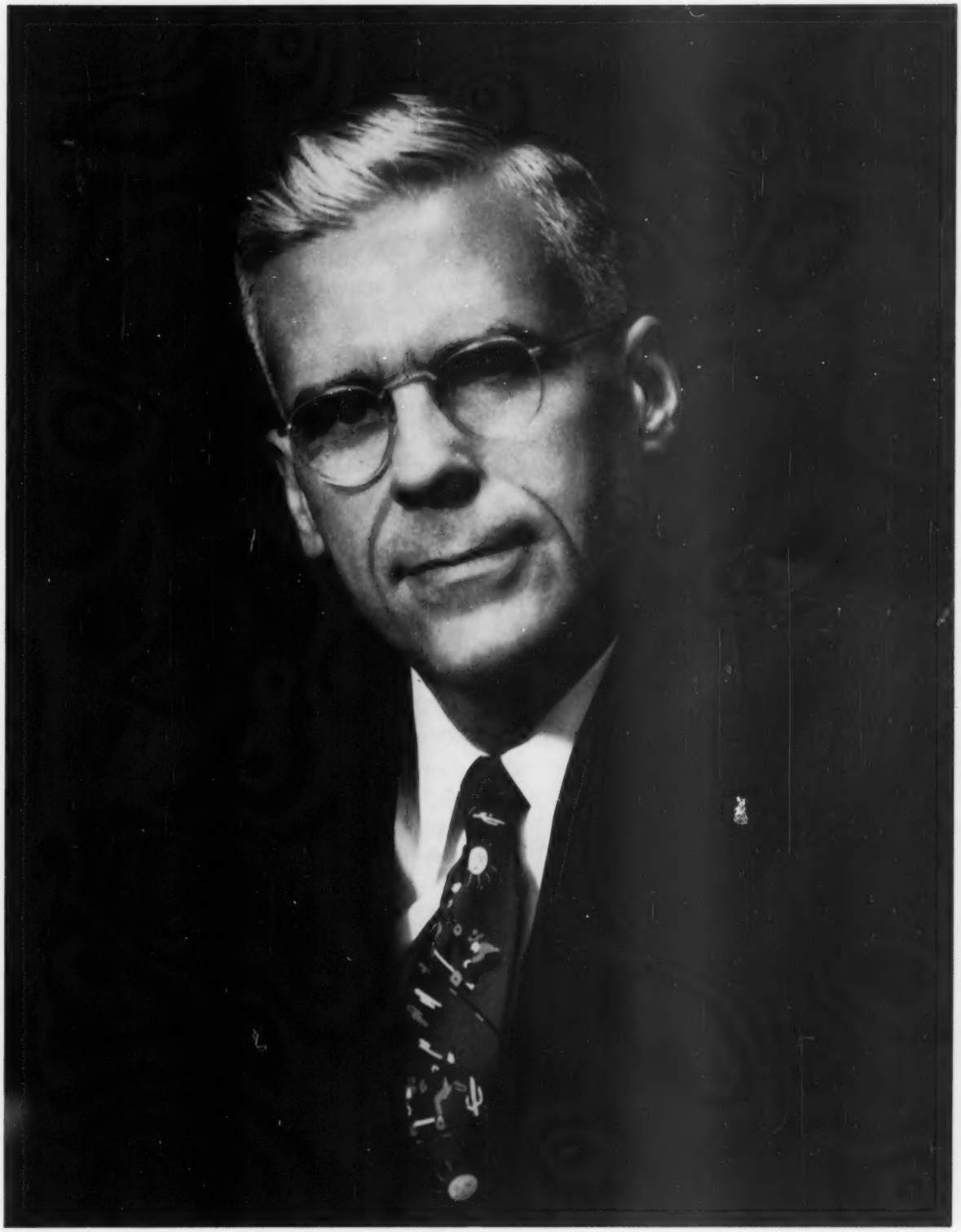
During World War II years, the company, as an integral unit and in association with other contractors, was awarded contracts from the Government amounting to $300 million. The work included airports, highways, cantonments, and ordnance and storage facilities in many states, ranging from Texas to Alaska. In 1950, at the request of the Army Engineers, Pete formed a joint venture to do a rush job in Greenland, known as "Operation Blue Jay." The contract, a $100-million-plus project, involved the construction of heavy-bomber installations and housing for several thousand persons. In 1952, the company was awarded a $1.2-billion contract by the Atomic Energy Commission to build a uranium plant in southern Ohio. The project required the Kiewit organization to direct overall operations involving approximately $1,000,000 worth of work a day.

On February 4, 1953, Pete was honored by The Moles, an association of prominent executives in the heavy-construction industry in the United States, as the recipient of the nonmember Moles Award for 1953. The citation accompanying the award read: "To Peter Kiewit, constructor extraordinary, in recognition of his rare vision, enterprise, and superb skill, notably in the fields of public service and world-wide heavy construction."

Peter Kiewit married Evelyn Stotts Newton on July 2, 1951, in Denver, Colorado. He has one son by a previous marriage. The family home is at 9702 North Thirtieth Street, Omaha, Nebraska.

Mr. Kiewit is an officer in sixteen associated corporations and a director of The Omaha National Bank. He is a member of the Omaha Club and the Omaha Country Club.

The demands of his far-flung construction interests leave little time for Pete to indulge in other activities. However, when time and opportunity permit, he and Mrs. Kiewit find recreation and relaxation in visits to their cattle ranches in Nebraska and Wyoming.



PETER KIEWIT

THE WINNERS

1953

Anthracite

COAL BROOK MINE
THE HUDSON COAL COMPANY
Carbondale, Pennsylvania

Bituminous-Coal

HANNA NO. 4-A MINE
THE UNION PACIFIC COAL COMPANY
Hanna, Wyoming

Metal

CALLOWAY-MARY MINE
TENNESSEE COPPER COMPANY
Ducktown, Tennessee

Nonmetallic

ANNANDALE LIMESTONE MINE
MICHIGAN LIMESTONE DIVISION
UNITED STATES STEEL CORPORATION
Boyers, Pennsylvania

Open-Pit

MAHONING MINE
PICKANDS MATHER & COMPANY
Hibbing, Minnesota

Quarry

ALPENA LIMESTONE QUARRY
WYANDOTTE CHEMICALS CORPORATION
Alpena, Michigan

"Let the worker carry around with him a mental picture of his wife and child, whose happiness depends upon his safe return after the day's work, and these loved ones become his surest sentinels of safety."

January 1925 - The Explosives Engineer

THE NATIONAL SAFETY COMPETITION OF 1953

A summary of the safety records of 583 underground and open-pit mines and quarries in 41 states throughout the nation, representing a total of 156,798,125 man-hours of work

SETH T. REESE
Chief, Accident Analysis Branch, Health and Safety Division
Bureau of Mines, U. S. Department of the Interior

THE 583 mines and quarries enrolled in the National Safety Competition of 1953 attained the best overall safety record in the 29-year history of this nation-wide contest, conducted by the United States Bureau of Mines. The records show that both the injury-severity rate of 4.039 days lost per thousand man-hours and the injury-frequency rate of 22.220 per million man-hours were more favorable, by wide margins, than in any other year since the competition began.

The anthracite and the bituminous-coal underground mines made new low records in both injury-frequency and injury-severity rates. A new low injury-severity rate was established in the metal underground mines group. And the injury-frequency rate at quarries was the lowest yet recorded. In all, 197 mines and quarries, including five of the six that won top honors in their respective groups, had injury-free records. This is the largest number of operating units with perfect safety records in the history of the competition.

On the basis of the 1953 results, it is reasonable to believe that the progress in safety made by the companies enrolled in the contest could be achieved by all comparable mines and quarries if each operation concentrated its attention on safety to the same degree and with the same enthusiasm as the enrolled mines and quarries.

The United States Bureau of Mines, in cooperation with THE EXPLOSIVES ENGINEER, inaugurated the National Safety Competition in 1925. During the intervening years, this competition has become a potent influence for the promotion of accident prevention in mines and quarries in the United States. Each year, mining and quarrying companies acting concertedly, through the National Safety Competition, launch a mass attack against occupational hazards—an attack that has drawn attention throughout the nation to the practicability of extracting minerals from the earth without injury to the men engaged in the work.

Outstanding features of the 1953 Competition:

1. **The best overall safety record in the 29-year history of the competition.**
2. **Perfect safety records at 197 mines and quarries, the greatest number of injury-free plants since the contest began in 1925.**
3. **An enrollment of 583 mines and quarries located in 41 states throughout the nation.**

This annual contest, strategically placed in the midst of a major industry, was designed to help stimulate greater safety-consciousness and to eliminate lost-time injuries among the million or more men employed in that industry, and upon which these men and their families depend for their daily sustenance.

In 1925, the first year of the National Safety Competition, the enrollment covered 210 mines and quarries; in 1930, the number of plants enrolled had increased to 337. In the 1953 competition, 583 mines and quarries, located in 41 states throughout the nation, were entered in the contest. The units competing in 1953 included 148 coal mines in 12 states; 62 metal mines in 15 states; 51 nonmetallic mines in 19 states; 102 open-pit mines in 26 states; and 220 quarries in 35 states. This widespread enrollment emphasizes the fact that the contest is a national safety crusade in fact as well as in name.

The statistics in the National Safety Competition of 1953 show that the 583 enrolled companies were operated a total of 156,798,125 man-hours of work. Perfect records of no lost-time injuries were recorded by 197 com-

COAL BROOK MINERS: Employes of The Hudson Coal Company's Coal Brook mine, Carbondale, Pennsylvania, made the best record in the National Safety Competition of 1953, in the anthracite underground mine group.

panies: 10 were in the anthracite and bituminous-coal mine groups; 9 in the metal mine group; 12 in the nonmetallic mine group; 39 in the open-pit mine group; and 127 in the quarry group. The operating personnel at these injury-free plants worked an aggregate of 17,662,589 man-hours. The attainment of perfect safety records clearly indicates extremely close cooperation on the part of employes and their supervisors in carrying through an efficient safety program. Each man employed at these no-accident plants has earned special commendation for the part he played in achieving such an outstanding accomplishment.

The records of the mines and quarries that won top honors in the 1953 National Safety Competition are:

Anthracite underground mines: Coal Brook mine, The Hudson Coal Company, Carbondale, Pennsylvania.

Bituminous-coal underground mines: Hanna No. 4-A mine, The Union Pacific Coal Company, Hanna, Wyoming.

Metal underground mines: Calloway-Mary mine, Tennessee Copper Company, Ducktown, Tennessee.

Nonmetallic underground mines: Annandale mine, Michigan Limestone Division, United States Steel Corporation, Boyers, Pennsylvania.

Open-pit mines: Mahoning mine, Pickands Mather & Company (Mahoning Ore and Steel Company), Hibbing, Minnesota.

Quarries: Alpena quarry, Wyandotte Chemicals Company, Alpena, Michigan.

ROTARY COAL TIPPLE: Clement Sinibaldi, at left, Frank Sahema, and Frank Hodorawis, members of Coal Brook mine's grievance and safety committee, have a look at the rotary tipple.

The Basis of Awards

The National Safety Competition is conducted each year by the Bureau of Mines, United States Department of the Interior. The operations participating are divided into six group classifications: anthracite underground mines, bituminous-coal underground mines, metal underground mines, nonmetallic underground mines, open-pit mines, and quarries. The five mines and the one quarry that have the lowest injury-severity rates—the number of days lost through disabling injuries per 1,000 man-hours of worktime—are the winners in their respective groups. A bronze Sentinels of Safety trophy, provided by THE EXPLOSIVES ENGINEER, is awarded to the winning mines and the quarry in recognition of outstanding leadership in safety work in the mineral industry.

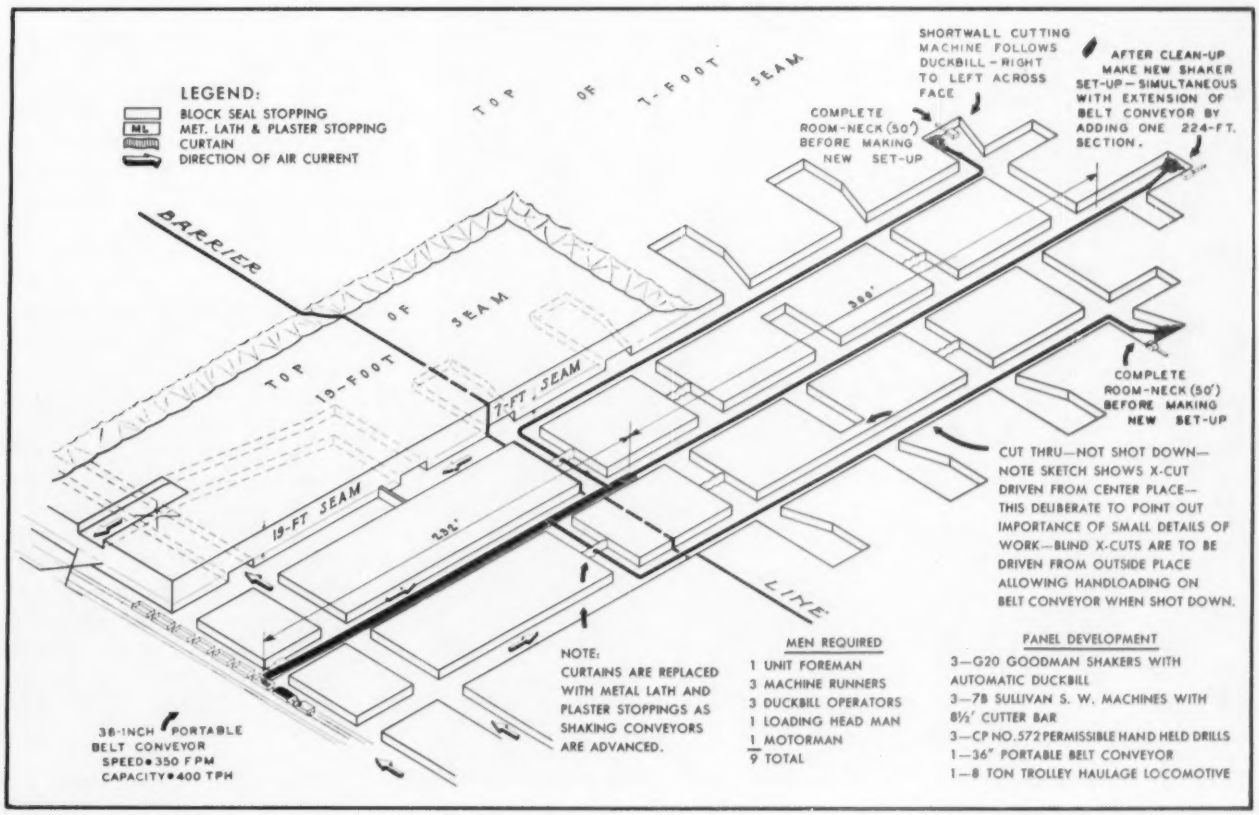
In addition to the trophy awards, a Sentinels of Safety flag, made in the traditional green-and-white colors of safety, is presented to each of the six winning operations. Flown over the winning properties, the flags are a daily reminder to the miners and quarrymen of what has been accomplished in safety on the job. The contribution of each employe and official to the record of the winning plants is

recognized by the award of individual Certificates of Achievement in Safety by the Bureau of Mines. Certificates are also awarded to the next four ranking plants after the winner, as well as to plants with no lost-time injuries during the year, provided 30,000 or more man-hours are worked. If two or more plants in a group classification in the contest have been free of disabling injuries during the year, their rankings are determined by the number of man-hours worked. A disabling injury is one that incapacitates an employe for longer than the remainder of the day on which the accident occurred. In the competition, fatal, permanent total, permanent partial, and temporary total injuries are considered in computing the accident-severity rate of each operation.

COAL BROOK OFFICIALS: Officials of Hudson Coal Company's Coal Brook colliery pose for the photographer in front of No. 35 tunnel: Left to right, Leo Healy, superintendent; C. Gerald Blake, assistant superintendent; K. T. Miller, safety engineer; George Robinson, mine foreman; three sectional foremen: James McAndrew, William Stratford, Preston Lambert.

The Committee of Award

The National Safety Competition is conducted under rules which are quite specific. They were adopted so that competing companies might be able to determine for themselves during the progress of the contest the approximate degree of success attending their efforts to win the Sentinels of Safety trophies. However, as a further means of assuring the confidence of enrolled companies in the impartiality in the conduct of the competition, the rules provide for a Committee of


LEGEND:
BLOCK SEAL STOPPING
MET. LATH & PLASTER STOPPING
CURTAIN
DIRECTION OF AIR CURRENT
TOP OF T-FOOT SEAM
SHORTWALL CUTTING MACHINE FOLLOWS DUCKBILL - RIGHT TO LEFT ACROSS FACE
AFTER CLEAN-UP MAKE NEW SHAKER SET-UP - SIMULTANEOUS WITH EXTENSION OF BELT CONVEYOR BY ADDING ONE 224-FT. SECTION.
COMPLETE ROOM-NECK (50') BEFORE MAKING NEW SET-UP
BARRIER
TOP OF SEAM
TOP 19-FOOT
7-FT. SEAM
19-FT SEAM
350'
232'
LINE
COMPLETE ROOM-NECK (50') BEFORE MAKING NEW SET-UP
CUT THRU—NOT SHOT DOWN—NOTE SKETCH SHOWS X-CUT DRIVEN FROM CENTER PLACE—THIS DELIBERATE TO POINT OUT IMPORTANCE OF SMALL DETAILS OF WORK—BLIND X-CUTS ARE TO BE DRIVEN FROM OUTSIDE PLACE ALLOWING HANDLOADING ON BELT CONVEYOR WHEN SHOT DOWN.
NOTE:
CURTAINS ARE REPLACED WITH METAL LATH AND PLASTER STOPPINGS AS SHAKING CONVEYORS ARE ADVANCED.
MEN REQUIRED
1 UNIT FOREMAN
3 MACHINE RUNNERS
3 DUCKBILL OPERATORS
1 LOADING HEAD MAN
1 MOTORMAN
9 TOTAL
PANEL DEVELOPMENT
3—G20 GOODMAN SHAKERS WITH AUTOMATIC DUCKBILL
3—7B SULLIVAN S. W. MACHINES WITH 8½' CUTTER BAR
3—CP NO. 572 PERMISSIBLE HAND HELD DRILLS
1—36" PORTABLE BELT CONVEYOR
1—8 TON TROLLEY HAULAGE LOCOMOTIVE
36-INCH PORTABLE BELT CONVEYOR
SPEED • 350 FPM
CAPACITY • 400 TPH

TRACKLESS MINING: The development of panel-belt mining with mobile loaders in Union Pacific Coal Company's Hanna 4-A mine at Hanna, Wyoming, resulted in operating efficiency of a high order. Room necks are staggered on opposite sides of the panel with room centers of 75 ft.

SAFETY CONFERENCE: Typical of the Union Pacific Coal Company management's approach to safety are regular staff meetings on the subject, held at frequent intervals in the main office in Rock Springs, Wyoming.

STORING EXPLOSIVES UNDERGROUND: In all Union Pacific's underground coal mines, each magazine for the storage of permissible explosives is located in accordance with proper rules and regulations. Only one day's supply of explosives is placed in each magazine.

Award. A summary of the records covering man-hours and injuries at each of the leading five contenders for each of the six trophies is submitted to this committee. Seven men, nationally prominent but having no connection with the Bureau of Mines, comprise the Committee of Award for the National Safety Competition of 1953. They are: Leo F. Reinartz, president, American Institute of Mining and Metallurgical Engineers; Ned Dearborn, president, National Safety Council; L. C. Campbell, president, National Coal Association; Charles Ferguson, director, Safety Division, United Mine Workers of America; Howard I. Young, president, American Mining Congress; A. T. Goldbeck, engineering director, National Crushed Stone Association, Inc.; and C. D. Franks, president, Portland Cement Association.

A majority vote of this committee of seven men determines the winners of the trophies. The vote of the committee for the 1953 contest rankings was unanimous for the winning operation in each of the six groups.

Rules of the Competition

Any underground or open-pit mine and any quarry is eligible to be en-

rolled in the National Safety Competition. To maintain eligibility for the Sentinels of Safety trophies, a plant must have been operated not less than 100 days and have a total time of work of not less than 30,000 man-hours in underground, quarry, or open-pit operations during the contest year. A designated official at each of the enrolled plants agrees to furnish a report of each lost-time or disabling injury, together with certain employment data, to the Bureau of Mines. Any injury which causes temporary disability is charged with the number of calendar days of the injured employe's inability to work. Such number of days includes Sundays, holidays, and all other days, whether the mine or quarry was active or idle. Each death or permanent total disability resulting from an accident while at work is charged with 6,000 days. For permanent partial disabilities, such as the loss of a finger or an eye, or the loss of function of any part of the body, the charge is such part of 6,000 days as the partial disability bears to the total and permanent destruction of an employe's ability to work. The various charges for permanent partial disabilities are listed in a detailed set of rules which are sent to each enrolling plant.

At the close of the competition each year, the determined severity rate and a summary of the basic figures from which the rate is derived are sent to each enrolled operation for certifica-

OLD TIMERS' BUILDING: Old Timers' Building in Rock Springs, Wyoming, is the center of diversified activities for Union Pacific coal mine employes, their families, and friends. To the right is "Charlie Smith," the first locomotive used in the company's mechanized mining program.

MINE SUPERVISORS: Mining operations in the Calloway-Mary mine of the Tennessee Copper Company are supervised by H. W. Whitlow, mine foreman, at left, assisted by R. R. Swafford, H. A. Picklesimer, R. J. Deaver, E. H. Hawkins, and Harold Dale.

CALLOWAY-MARY'S MINERS: With a perfect safety record during 145,088 man-hours of work underground in 1953, the employes of Tennessee Copper Company's Calloway-Mary mine, Ducktown, Tennessee, won first place in the metal mine group.

THE CENTRAL SHAFT: The Basin ores mined deep underground in the Calloway-Mary mine at Ducktown are hoisted up this central shaft to the surface for delivery to the Copperhill plant.

tion as to the accuracy and completeness of the original data furnished by the company to the Bureau of Mines.

Application forms for enrollment in the contest and a list of the rules of the competition may be obtained by writing to the Accident Analysis Branch, Health and Safety Division, Bureau of Mines, United States Department of the Interior, Washington 25, D. C.

Anthracite Underground Mines

The Coal Brook mine of The Hudson Coal Company at Carbondale, Lackawanna County, Pennsylvania, in the northern anthracite field, won the top safety honor in the anthracite underground mines group. Its winning record in 1953 shows the mine employes worked 209,088 man-hours with only 4 disabling injuries that caused an aggregate time loss of 44 days. This represents an injury-severity rate of 0.21 day lost per 1,000 man-hours of working time.

The award of the Sentinels of Safety trophy is the first time Coal Brook mine has won it in 19 years of participation in the National Safety Competition. Since its enrollment in 1935, Coal Brook mine has been awarded Certificates of Achievement in Safety in the 1942 and 1952 competitions. In 1942, when it was first so honored, this mine was operated a total of 1,127,578 man-hours with 83 disabling injuries to its personnel. This resulted in a frequency rate of 73.609 injuries per million man-hours and a severity rate of 2.148 days per thousand man-hours. Ten years later, when it received the award of a second Certificate of Achievement in Safety, the mine was operated 277,590 man-hours with only 15 disabling injuries, representing a frequency rate of 54.037 and a severity rate of 0.897. The accident-frequency rate of 19.131 injuries per million man-hours and the severity rate of 0.21 day lost per thousand man-hours at this mine last year were lower than corresponding rates in any year in which the Coal Brook mine has participated in the National Safety Competition. This conspicuous improvement in accident prevention over a period of years shows clearly what can be attained through the close cooperating effort of mine employes and company officials in making a well-planned safety program work.

In all, 42 anthracite mines were enrolled in the 1953 competition. They had an aggregate worktime of approximately 11 million man-hours, with record low injury-frequency and injury-severity rates. These rates were 68.633 and 6.271, respectively. The previous lowest frequency rate of 71.786 was recorded in the 1935 competition; the previous lowest severity rate was 7.464, in the 1926 competition.

Bituminous-Coal Mines

The best safety record in the bituminous-coal underground mines group was made by Hanna No. 4-A mine of The Union Pacific Coal Company, located at Hanna, Carbon County, Wyoming. The Sentinels of Safety trophy was awarded to this mine for its perfect record of no lost-time injuries during a working time of 574,702 man-hours during 1953.

Hanna No. 4-A mine was entered in the National Safety Competition in 1934. During the past 20 years, its employes have worked 11,932,264 man-hours with only 84 injuries which caused 107,264 days of disability. This adds up to a frequency rate of 7.04 and a severity rate of 8.989. By virtue of excellent safety records in 1936, 1938, and 1944, this mine was awarded

Certificates of Achievement in Safety in those years. The award of the Sentinels of Safety trophy in 1953 is a tribute to each mine employe for his determination to work with safety, thereby protecting himself and his fellow workmen. It is worthy of note, at this time, to direct attention to the fact that the safety records made at other mines of The Union Pacific Coal Company are outstanding in the history of this nation-wide competition. The award of the trophy to the Hanna No. 4-A mine for its 1953 record marks the fourteenth time a similar award has been made to a U. P. Coal Company mine in the 21 years it has enrolled a unit in the competition.

The 106 bituminous-coal operations entered in last year's contest were worked more than 63 million man-hours. They made new low injury-frequency and injury-severity rates of 17.858 and 4.637, respectively. These rates represent improvements of 21 and 18 per cent as compared with the previous low rates of 22.682 and 5.685, which were established in the 1952 competition.

SCALING DOWN LOOSE GROUND: On the 24th level in the Calloway-Mary mine of Tennessee Copper Company, the photographer took a picture of A. G. Key as he scaled down loose ground at a working place.

THE COPPERHILL PLANT: An aerial view of the plant at Copperhill, Tennessee, where the smelting of iron sinters for steel mills and the manufacture of sulphuric acid and other products are carried on.

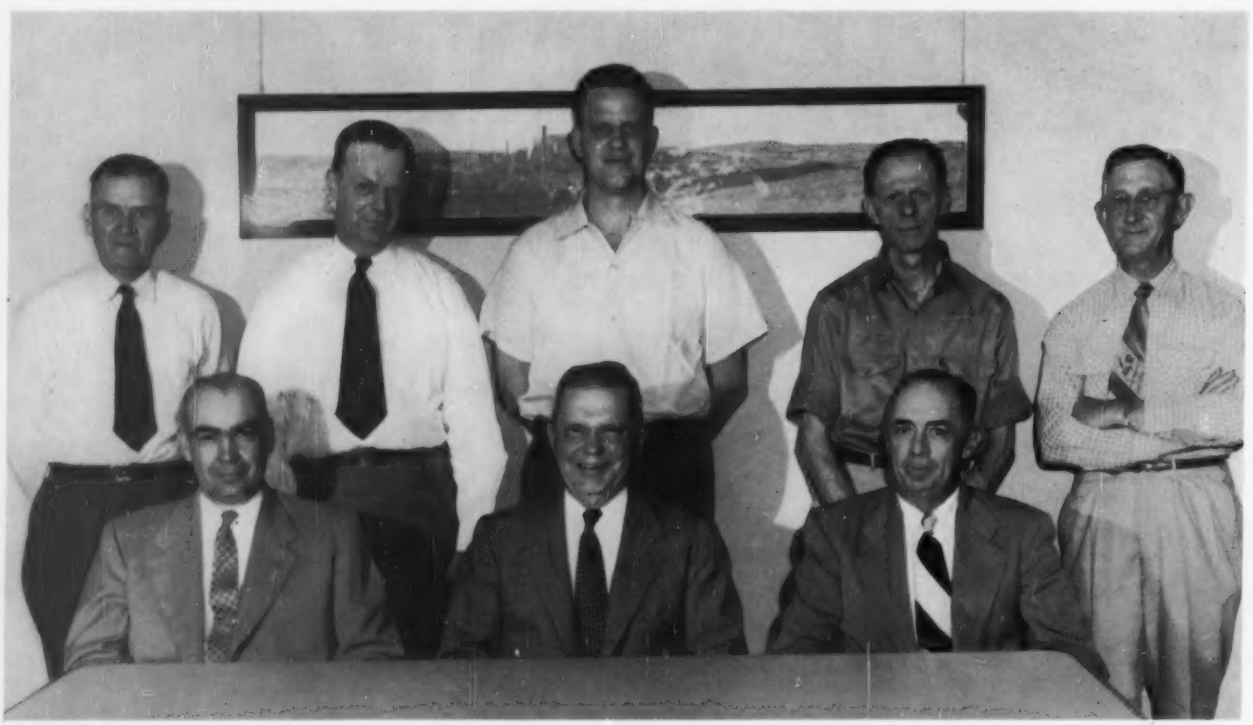
THE SAFETY COMMITTEE: Following a meeting of Tennessee Copper Company's labor-management safety committee at Copperhill, Tennessee, the members of the joint committee have their picture taken.

Metal Mines

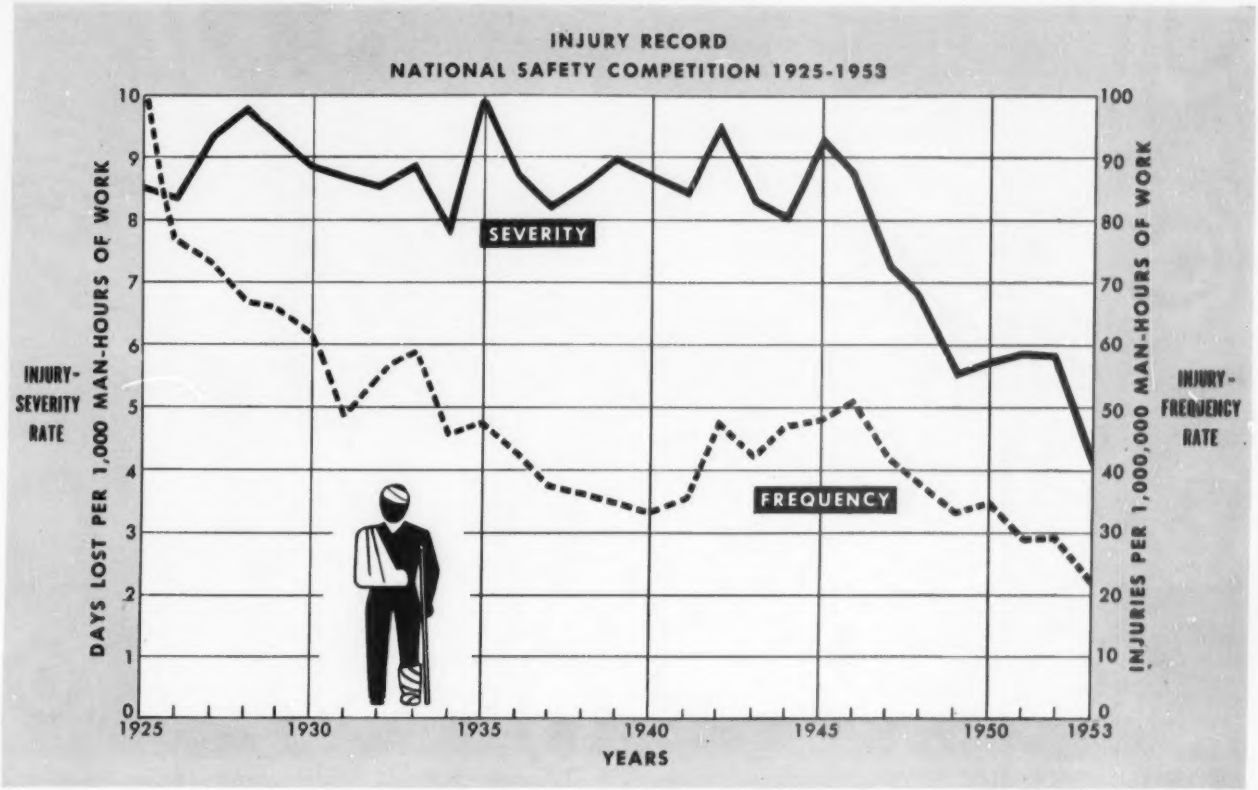
The Calloway-Mary mine of the Tennessee Copper Company at Ducktown, Polk County, Tennessee, won first place and the Sentinels of Safety trophy in the metal underground mines group. Its winning 1953 record was a perfect one, with no lost-time injuries during a total worktime of 145,088 man-hours.

This mine became a competitor for national safety honors in 1944. Since that time, it has made several outstanding safety records. In 1945, 1946, 1948, and 1952, Calloway-Mary mine received honorable mention and was awarded Certificates of Achievement in Safety. During the ten years it has been a participant in the contest, it has had six injury-free years. The employes at this mine have earned heartiest congratulations for the perfect record in 1953, and for their persistent efforts toward achieving this goal.

The 62 metal mines enrolled in 1953 were operated 24¾ million man-hours, resulting in an injury-severity rate of 3.912 days per thousand man-hours. This is the lowest rate attained by this group in the history of the competition. The injury-frequency rate of 33.97 per million man-hours was only slightly higher than the 1952 rate; however, it



COMPANY OFFICIALS: Officials of Tennessee Copper Company include: Front row, left to right: R. R. Burns, assistant manager; T. A. Mitchell, vice president and general manager; Lamar Weaver, general superintendent. Back row, left to right: Sam Craig, general mine foreman; H. F. Kendall, mine superintendent; A. D. Annand, mine safety engineer; D. R. Wagner, chief mining engineer; S. E. Sharp, safety director.



SALIENT FEATURES OF THE NATIONAL SAFETY COMPETITION

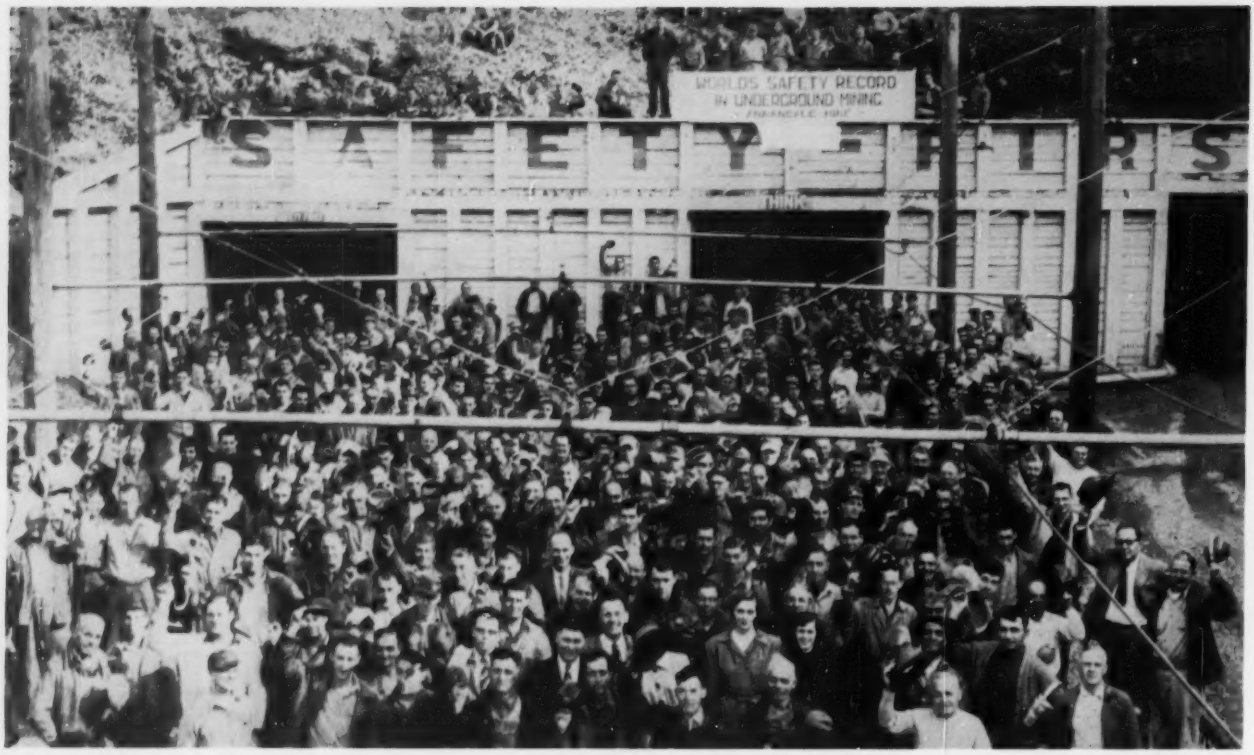
1953

Type of Mine	*Number of Mines*	*Man-hours*	*Fatal Injuries*	*Nonfatal Injuries*	*Total*	*Days of Disability*	*Frequency Rate*	*Severity Rate*
Anthracite	42	10,883,976	7	740	747	68,250	68.633	6.271
Bituminous-coal	106	63,109,468	31	1,096	1,127	292,631	17.858	4.637
Metal	62	24,786,515	9	833	842	96,964	33.970	3.912
Nonmetallic mineral	51	9,878,291	12	192	204	87,504	20.651	8.858
Total	261	108,658,250	59	2,861	2,920	545,349	26.873	5.019
Open-pit	102	24,819,445	2	304	306	29,925	12.329	1.206
Quarries	220	23,320,430	4	254	258	58,048	11.063	2.489
Grand Total	583	156,798,125	65	3,419	3,484	633,322	22.220	4.039

TWENTY-NINE-YEAR HISTORY OF THE NATIONAL SAFETY COMPETITION

1925-1953

Type of Mine	*Man-hours*	*Fatal Injuries*	*Nonfatal Injuries*	*Total*	*Days of Disability*	*Frequency Rate*	*Severity Rate*
Anthracite	644,960,619	759	56,389	57,148	6,702,362	88.607	10.392
Bituminous-coal	1,364,652,558	1,369	59,292	60,661	12,995,883	44.452	9.523
Metal	515,082,581	413	18,012	18,425	3,602,251	35.771	6.994
Nonmetallic mineral	127,859,956	83	3,645	3,728	732,385	29.157	5.728
Total	2,652,555,714	2,624	137,338	139,962	24,032,881	52.765	9.060
Open-pit	308,785,226	90	5,109	5,199	884,884	16.837	2.866
Quarries	479,970,342	237	9,310	9,547	2,139,201	19.891	4.457
Grand Total	3,441,311,282	2,951	151,757	154,708	27,056,966	44.956	7.862



ANNANDALE MINE EMPLOYES: These Annandale miners, saluting the photographer in front of the mine entrance at Boyers, Pennsylvania, won the Sentinels of Safety trophy for the second straight year. Their record for 1953 was 896,629 man-hours of work without a lost-time injury.

was lower than the average rate for the 29-year period of the contest.

Nonmetallic Underground Mines

For the second consecutive year, the Annandale limestone mine of Michigan Limestone Division, United States Steel Corporation, located at Boyers, Butler County, Pennsylvania, won top honors for the best safety record in the nonmetallic underground-mine group. In 1953, this mine was operated 896,629 man-hours without a lost-time injury.

During the three years Annandale mine has participated in the competition, only one lost-time injury was recorded, causing a loss of 12 days during a total worktime of 2,549,932 man-hours. During this period, the accident-frequency rate was 0.392 per million man-hours and the severity rate 0.005 per thousand man-hours. The attainment of a perfect safety record for the second straight year is definite proof that each Annandale mine employe and official has worked unceasingly toward the elimination of accidents on the job.

SAFETY COMMITTEE: The members of Annandale mine's safety committee represent the management and the local union. The work of this group is responsible, in large measure, for the elimination of lost-time accidents at this underground limestone mining operation.

In the nonmetal group, the average participant did not fare too well in preventing accidents. The safety record for the group in 1953 reveals an injury-severity of 8.858 days lost per 1,000 man-hours of exposure, close to five times higher than the 1952 rate and well above the average rate for the group since 1925. In 1953, the injury-frequency rate was also slightly higher, but lower than the average rate for the group in the 29 contest years. Statistics show sporadic recessions in safety records at nonmetallic mines in the past, with recoveries quick and consistent.

Open-pit Mines

A veteran competitor, the Mahoning mine of Pickands Mather & Company

BLASTED LIMESTONE: A pile of broken limestone in a room underground in the Annandale mine after a primary blast had been fired. The blasted limestone is recovered and delivered to plants on the surface by various modern mechanical units.

(Mahoning Ore and Steel Company) at Hibbing, St. Louis County, Minnesota, came back to the winner's circle in 1953. During last year, this mine was worked 773,666 man-hours and a perfect record of no lost-time injuries was recorded.

Mahoning mine has been a continuous participant in the National Safety Competition since its first enrollment 24 years ago. During that long period, it has compiled an outstanding record in accident prevention, with a total operating figure of 10,298,373 man-hours and only 15 disabling injuries. Its best years, from a safety standpoint, were 1931, 1938, 1940, 1941, 1942, 1945, and 1947, when it won the Sentinels of Safety trophy for the best record in its group. In 1932, 1934, 1935, 1946, 1949, and 1950, it received awards of Certificates of Achievement in Safety for splendid accomplishments in preventing accidents in the mine. Mahoning

LOADING A MINE CAR: A shuttle car operator in the Annandale mine discharges blasted limestone from one of the underground work rooms into a mine car for transportation outside to the crushing plant.

ANNANDALE'S SUPERVISORY FORCE: Front row, left to right: L. E. Hooks, chief electrician; R. H. Kerr, master mechanic; T. A. McClure, assistant mine foreman; A. S. Wiland, chief clerk and paymaster. Second row, left to right: L. L. Kohlmeyer, assistant mine foreman; G. A. Sweetapple, mine foreman; M. C. Scott, plant engineer; J. W. Baird, manager; A. J. Guerin, plant foreman.

CRUSHING AND SCREENING: This view of the crushing and screening plant at Annandale mine is typical of the good-housekeeping practices in effect at all properties of the Michigan Limestone Division of United States Steel Corporation.

mine employes merit highest praise for their continuing efforts in making possible such magnificent records.

The enrollment in the open-pit mines group in 1953 was 102. This was an increase of 12 over the 1952 figure, representing the greatest number of mines to compete in this classification since the competition was started. The average participant had favorable injury experience. The overall record of this group showed an injury-severity rate of 1.206, the second lowest in the 29 years of the contest, bettered only in 1931. The injury-frequency rate, 12.329 per million man-hours, was lower than the 1952 rate by more than 6 per cent, and close to 37 per cent better than the average injury-frequency rate for this group since the start of the competition.

Quarries

The Alpena limestone quarry of Wyandotte Chemicals Corporation, located at Alpena, Alpena County, Michigan, had the best injury experience of all the 220 quarries enrolled in the 1953 competition. The Sentinels of Safety trophy was awarded to the Alpena quarry for an injury-free record during 459,668 man-hours of exposure.

This is the second award of the famous trophy to this quarry during its 13 years of participation in the National Safety Competition. In 1943, it won top honors and received the trophy award for a perfect safety record. In 1951, it ranked second in the group, and was awarded a Certificate of Achievement in Safety. During the 13 years Alpena quarry has been enrolled in the competition, it has been worked 5,671,512 man-hours with only 45 disabling injuries. This represents an all-time frequency rate of 7.934 injuries per million man-hours and a severity rate of 0.762 day per thousand man-hours. The winning of the award of the Sentinels of Safety trophy in 1953 is a tribute to the employes and officials at this quarry for their continuing efforts to eliminate accidents in their daily work. They are deserving of heartiest congratulations for their perfect record in 1953 and for their accomplishments in promoting safety in the quarry through the years.

The 220 quarries entered in the 1953 contest, the second largest enrollment for the group in the history of the competition, were worked more than 23 million man-hours, a new record for the quarry group. The injury-fre-

MAHONING MINE EMPLOYES: This group of Mahoning mine employes from the mechanical repair department keeps the ore-moving equipment, such as the haulage truck in the background, in top operating condition.

quency rate was 11.063; the injury-severity rate was 2.489. The frequency rate for the group as a whole was the best annual experience in the history of the competition. The severity rate was bettered in only three other years.

Perfect Safety Records

The mines and quarries that operated through 1953 without a lost-time injury totaled 197, the greatest number of injury-free plants in the history of the National Safety Competition. Included in this select group were 42 plants, each of which was worked fewer than 30,000 man-hours, the minimum required by the competition rules for consideration in awarding the trophies and certificates. Many of these 42 operations have been enrolled in the competition year after year, even though they were aware of their ineligibility for receiving awards. The employes and officials at these 42 operations are deserving of the highest commendation for continuing to participate in the contests and for remaining in them despite the award limitations. Their accomplishments in operating injury-free plants contributed importantly to the making of the overall safety record in the 1953 competition. These operations were as follows:

ANTHRACITE UNDERGROUND MINES

No. 10 Slope mine, Moosic, Lackawanna County, Pennsylvania, operated by Ardoline Coal Company, worked 29,038 man-hours without a disabling injury.

MAHONING'S SUPERVISORS: Seated, left to right: H. J. Rutherford, general pit foreman; W. D. Webb, superintendent; Floyd Randall, truck foreman. Standing, left to right: W. J. O'Connor, master mechanic; Francis Kinzel, pit foreman; T. J. Fields, pit foreman; Bruce Stunkard, mine engineer; Rano Bugliosi, mine clerk.

STRIPPING OPERATIONS: A close-up of an electric power shovel excavating and loading out blasted rock overburden which covers the iron ore deposit in the Mahoning mine.

OPEN-PIT MINING: A look at some of the open-pit activities for the recovery of iron ore in the Mahoning mine of Pickands Mather & Company at Hibbing, Minnesota.

Pittston mine, Pittston, Luzerne County, Pennsylvania, operated by P. and J. Coal Company, worked 18,837 man-hours without a disabling injury.

John Jones mine, Mahanoy City, Schuylkill County, Pennsylvania, operated by John Jones Coal Company, worked 6,048 man-hours without a disabling injury.

Trevorton mine, Trevorton, Northumberland County, Pennsylvania, operated by Konyar Coal Company, worked 6,048 man-hours without a disabling injury.

METAL UNDERGROUND MINES

Athletic zinc sulphide in dolomite limestone mine, Jefferson City, Jefferson County, Tennessee, operated by American Zinc Company of Tennessee, worked 25,221 man-hours without a disabling injury.

Jarnagin zinc sulphide in dolomite limestone mine, Jefferson City, Jefferson County, Tennessee, operated by American Zinc Company of Tennessee, worked 22,795 man-hours without a disabling injury.

Blue Kitten lead, silver, and zinc mine, Ketchum, Blaine County, Idaho, operated by Sun Valley Lead-Silver Mines, Incorporated, worked 1,600 man-hours without a disabling injury.

NONMETALLIC UNDERGROUND MINES

No. 7 cement stone and limestone mine, West Coplay, Lehigh County, Pennsylvania, operated by Coplay Cement Manufacturing Company, worked 25,790 man-hours without a disabling injury.

Hannibal limestone mine, Hannibal, Marion County, Missouri, operated by Marblehead Lime Company, worked 20,748 man-hours without a disabling injury.

Marblehead limestone mine, Quincy, Adams County, Illinois, operated by Marblehead Lime Company, worked 12,308 man-hours without a disabling injury.

Hanover gypsum mine, Hanover, Fergus County, Montana, operated by Ideal Cement Company, worked 11,448 man-hours without a disabling injury.

Alliance talc and soapstone mine, Darwin, Inyo County, California, operated by George W. Koest Company, worked 2,304 man-hours without a disabling injury.

SAFETY COMMITTEES: The Mahoning mine employes and foremen safety committees include: Front row, left to right: Mike Terzich, William O'Connor, Tom Fields, Herbert Gerber, Francis Gerber. Back row, left to right: Arvo Maki, Floyd Randall, Emil Gustafson, Byron Wagner, John Znidar, Harold Flann, Cecil Scott, Harold Rutherford.

OPEN-PIT MINES

Chateaugay open-pit iron-ore mine, Lyon Mountain, Clinton County, New York, operated by Republic Steel Corporation, worked 29,808 man-hours without a disabling injury.

Arcturus open-pit iron-ore mine, Marble, Itasca County, Minnesota, operated by Oliver Iron Mining Division of the United States Steel Corporation, worked 26,363 man-hours without a disabling injury.

Wade iron-ore mine, Buhl, St. Louis County, Minnesota, operated by Pickands Mather & Company (Utica Mining Company), worked 16,750 man-hours without a disabling injury.

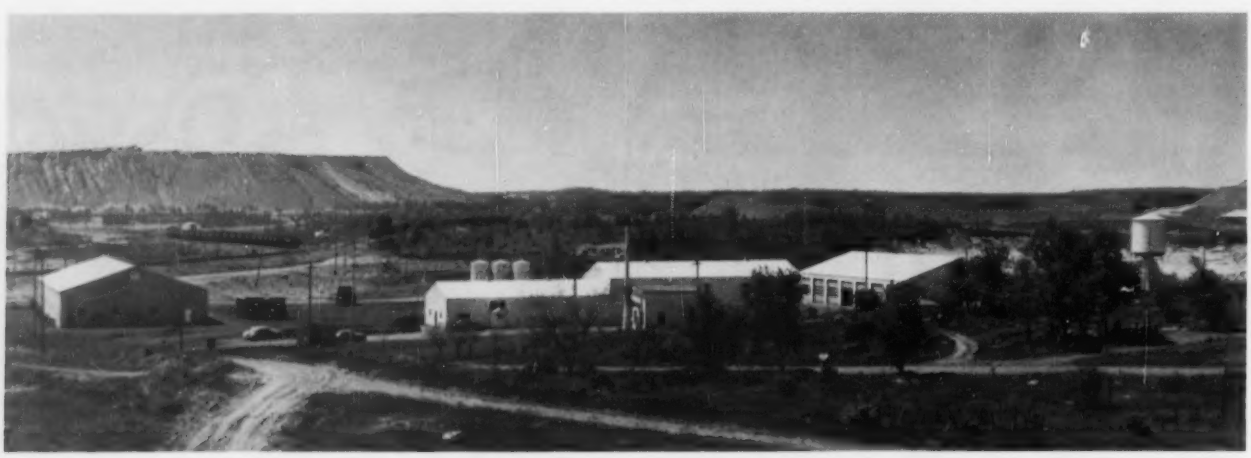
Cornell iron-ore mine, Iron Mountain, Dickinson County, Michigan, operated by Globe Iron Company, worked 11,972 man-hours without a disabling injury.

Celo mica mine, Celo, Yancey County, North Carolina, operated by Consolidated Mica Company, worked 6,400 man-hours without a disabling injury.

Colbate emery mine, Groton-on-Hudson, Westchester County, New York, operated by Colbate Emery Company, Incorporated, worked 5,232 man-hours without a disabling injury.

Idaho Falls pumice mine, Idaho Falls, Bonneville County, Idaho, operated by Clark Concrete Construction Corporation, worked 4,320 man-hours without a disabling injury.

Glendon pyrophyllite mine, Glendon, Moore County, North Carolina, operated by Glendon Pyrophyllite Company, worked 2,828 man-hours without a disabling injury.



MINE BUILDINGS: This view of group No. 4 buildings at Mahoning mine, Hibbing, Minnesota, includes offices, repair shops, fuel storage tanks, a truck storage garage, and a warehouse.

THE ALPENA QUARRY: In the quarry of Wyandotte Chemicals Corporation at Alpena, Michigan, drilling, blasting, and excavating operations are carried on at various levels to maintain large production schedules of high-grade limestone for industrial uses.

South Properties vermiculite mine, Encampment, Carbon County, Wyoming, operated by Mikolite Sales Corporation, worked 2,496 man-hours without a disabling injury.

Birmingham marl mine, Birmingham, Burlington County, New Jersey, operated by The Permutit Company, worked 1,200 man-hours without a disabling injury.

Cedar Fork pumice mine, Cedar Fork, Utah County, Utah, operated by W. H. Prince & Sons Block Company, Incorporated, worked 824 man-hours without a disabling injury.

QUARRIES

Trinity Division Limestone quarry, Dallas, Dallas County, Texas, operated by General Portland Cement Company, worked 28,638 man-hours without a disabling injury.

Sigurd gypsum quarry, Sigurd, Sevier County, Utah, operated by Western Gypsum Company, worked 28,213 man-hours without a disabling injury.

Limestone Plant quarry, New Athens, Harrison County, Ohio, operated by Hanna Coal Company, Division of Pittsburgh Consolidation Coal Company, worked 26,683 man-hours without a disabling injury.

North Baltimore limestone quarry, North Baltimore, Wood County, Ohio, operated by The France Stone Company, worked 25,559 man-hours without a disabling injury.

Medusa limestone quarry, York, York County, Pennsylvania, operated by Medusa Portland Cement Company, worked 25,215 man-hours without a disabling injury.

San Antonio limestone quarry, San Antonio, Bexar County, Texas, operated by Longhorn Portland Cement Company, worked 19,812 man-hours without a disabling injury.

Hyndman ganister quarry, Hyndman, Bedford County, Pennsylvania, operated by Leap Ganister Rock Company, worked 19,800 man-hours without a disabling injury.

Diamond Springs limestone quarry, Diamond Springs, El Dorado County, California, operated by Diamond Springs Lime Company, worked 18,392 man-hours without a disabling injury.

Manitowoc limestone quarry, Manitowoc, Manitowoc County, Wisconsin, operated by Rockwell Lime Company, worked 17,395 man-hours without a disabling injury.

Inkom railroad riprap and ballast quarry, Inkom, Bannock County, Idaho, operated by Morrison-Knudsen Company, Incorporated,

ALPENA'S MECHANICAL CREW: A group of machinists, welders, blacksmiths, and repairmen who keep the Alpena quarry-and-plant equipment in first-class working order.

RECOVERING BLASTED LIMESTONE: A close-up of one of the electrically operated shovels in a bank of blasted limestone, loading into a Euclid truck for delivery to the crushing plant.

worked 14,016 man-hours without a disabling injury.

Randville black and pink granite, white and gray dolomite quarry, Iron Mountain, Dickinson County, Michigan, operated by Superior Rock Products Company, worked 12,600 man-hours without a disabling injury.

Iantha bituminous rock asphalt quarry, Iantha, Barton County, Missouri, operated by Barton County Rock Asphalt Company, worked 11,350 man-hours without a disabling injury.

Montebello decomposed granite quarry, Montebello, Los Angeles County, California, operated by L. A. Decomposed Granite Company, worked 10,160 man-hours without a disabling injury.

Mediapolis Portable limestone quarry, Mediapolis, Des Moines County, Iowa, operated by Raid Brothers Construction Company, worked 8,262 man-hours without a disabling injury.

West Plains agricultural limestone quarry, West Plains, Howell County, Missouri, operated by Kilkenny Limestone Company, worked 6,400 man-hours without a disabling injury.

Frederick limestone quarry, Frederick, Frederick County, Maryland, operated by Shank and Etzler Lime Company, worked 6,125 man-hours without a disabling injury.

Feller agricultural lime quarry, Verona, Dane County, Wisconsin, operated by Alva Brumm Company, worked 4,800 man-hours without a disabling injury.

Birmingham crushed shale quarry, Birmingham, Jefferson County, Alabama, operated by Lone Star Cement Corporation, worked 4,656 man-hours without a disabling injury.

Redmond salt and lime quarry, Redmond, Sevier County, Utah, operated by Poulson Brothers Salt Company, worked 1,880 man-hours without a disabling injury.

Scope of the Competition

The nation-wide interest in the National Safety Competition of 1953 is indicated by the enrollment of 583 mines and quarries located in the following states:

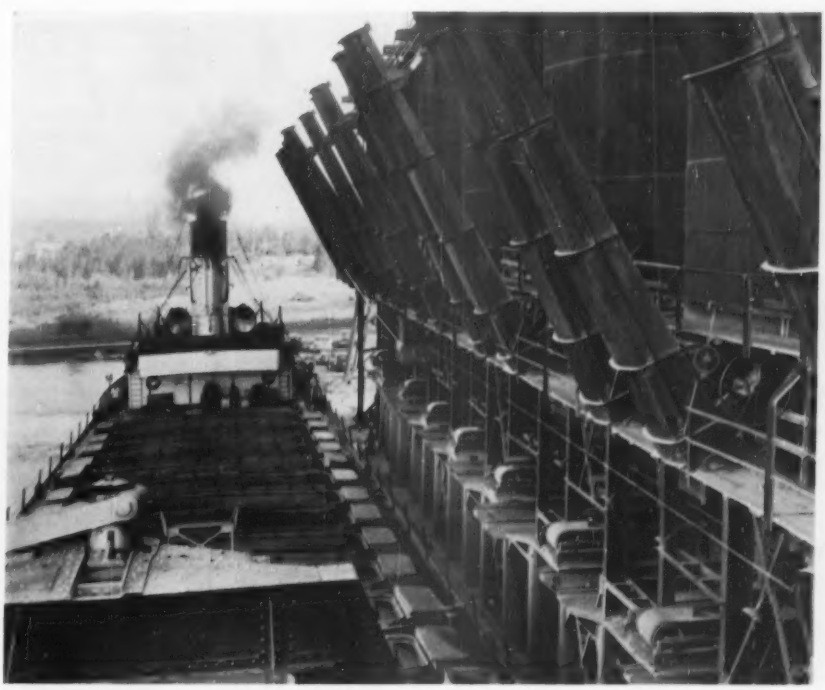
State	*Plants Enrolled*
Alabama	22
Arizona	6
Arkansas	3
California	18
Colorado	9
Connecticut	1
Florida	5
Georgia	5
Idaho	5
Illinois	18
Indiana	7
Iowa	8
Kansas	7
Kentucky	19
Louisiana	3
Maine	1
Maryland	6
Massachusetts	4
Michigan	40

QUARRY TRUCK OPERATORS: At the end of a workday, the photographer took a picture of some of the quarry truck operators in front of a fleet of Alpena's motor truck equipment.

SUPERVISORY PERSONNEL: Alpena's supervisory personnel also serve as the quarry safety committee. Seated above, at right foreground, William Hagen, quarry superintendent, discusses a report with Frank Macaulay, Wyandotte's safety director. At Mr. Macaulay's left, clockwise, are: Harold MacLennon, Ed LaLonde, Clayton Miller, Elmer Olsen, Percy Thompson, Ben Raymond, and Allen McNeil.

Minnesota	56
Missouri	14
Montana	2
Nevada	3
New Jersey	5
New Mexico	1
New York	29
North Carolina	11
North Dakota	2
Ohio	26
Oklahoma	2
Oregon	1
Pennsylvania	137
Tennessee	15
Texas	13
Utah	12
Vermont	2
Virginia	12
Washington	3
West Virginia	33
Wisconsin	7
Wyoming	10

A breakdown of the 583 plant locations listed here shows 37.8 per cent are quarries; 18.2 per cent are bituminous-coal mines; 17.5 per cent are open-pit mines; 10.6 per cent are metal mines; 8.7 per cent are nonmetallic mines; and 7.2 per cent are anthracite mines.



LOADING A STEAMER: Prepared sizes of limestone are loaded into the hatches of a steamer by belt conveyors at Alpena, Michigan, for transportation to destinations on the Great Lakes.

ALL-TIME WINNERS

ANTHRACITE

1925—Hazle Brook Coal Company, *Upper Lehigh Mine*, Upper Lehigh, Pa.
1926—Jeddo-Highland Coal Company, *Highland No. 6 Mine*, Jeddo, Pa.
1927—Jeddo-Highland Coal Company, *Highland No. 6 Mine*, Jeddo, Pa.
1928—Jeddo-Highland Coal Company, *Highland No. 7 Mine*, Jeddo, Pa.
1929—Jeddo-Highland Coal Company, *Highland No. 6 Mine*, Jeddo, Pa.
1930—Coxe Brothers & Company, Inc., *Tomhicken Mine*, Jeddo, Pa.
1931—Jeddo-Highland Coal Company, *Highland No. 2 Mine*, Jeddo, Pa.
1932—Jeddo-Highland Coal Company, *Highland No. 7 Mine*, Jeddo, Pa.
1933—The Hudson Coal Company, *Stillwater Mine*, Vandling, Pa.
1934—Harleigh-Brookwood Coal Company, *Laurence Mine*, Mahanoy Plane, Pa.
1935—Jeddo-Highland Coal Company, *Jeddo No. 7 Mine*, Harleigh, Pa.
1936—Hazle Brook Coal Company, *Raven Run Mine*, Raven Run, Pa.
1937—Jeddo-Highland Coal Company, *Jeddo No. 7 Mine*, Harleigh, Pa.
1938—Colonial Colliery Company, *Greenough Mine*, Natalie, Pa.
1939—The Hudson Coal Company, *Eddy Creek Mine*, Olyphant, Pa.
1940—Hazle Brook Coal Company, *Midvalley Mine*, Wilburton, Pa.
1941—Eddie & Joe Coal Company, *Eddie & Joe Mine*, Simpson, Pa.
1942—Jeddo-Highland Coal Company, *Stockton Mine*, Stockton, Pa.
1943—Morgan Coal Company, *Oregon Slope Mine*, Pittston, Pa.
1944—The Hudson Coal Company, *Miles Slope Mine*, Dickson City, Pa.
1945—Jermyn-Green Coal Company, *Butler Mine*, Pittston, Pa.
1946—Jermyn-Green Coal Company, *Butler Mine*, Pittston, Pa.
1947—Jermyn-Green Coal Company, *Butler Mine*, Pittston, Pa.
1948—Philadelphia and Reading Coal and Iron Company, *Hunter Tunnel Mine*, Ashland, Pa.
1949—Kehoe-Berge Coal Company, *Stevens Shaft Mine*, Exeter, Pa.
1950—The Hudson Coal Company, *Birdseye Mine*, Throop, Pa.
1951—Ploskonka Coal Company, *No. 5 Hill Mine*, Archbald, Pa.
1952—Philadelphia and Reading Coal and Iron Company, *Hunter Tunnel Mine*, Ashland, Pa.
1953—The Hudson Coal Company, *Coal Brook Mine*, Carbondale, Pa.

BITUMINOUS-COAL

1925—United States Coal and Coke Company, *No. 6 Mine*, Gary, W. Va.
1926—United States Coal and Coke Company, *No. 6 Mine*, Gary, W. Va.
1927—United States Coal and Coke Company, *No. 2 Mine*, Gary, W. Va.
1928—United States Coal and Coke Company, *No. 4 Mine*, Gary, W. Va.
1929—DeBardeleben Coal Corporation, *Hull No. 33 Mine*, Dora, Ala.
1930—Penn Central Light and Power Company, *No. 1 Mine*, Coalmont, Pa.
1931—Phelps-Dodge Corporation, *Dawson No. 1 Mine*, Dawson, N. Mex.
1932—Electro Metallurgical Company, Alloy, W. Va.
1933—The Union Pacific Coal Company, *"B" Mine*, Superior, Wyo.
1934—The Union Pacific Coal Company, *"C" Mine*, Superior, Wyo.
1935—Elkhorn Piney Coal Company, *Ingram Branch Mine*, Ingram Branch, W. Va.
1936—The Koppers Coal Company, *Coxton Mine*, Coxton, Ky.
1937—The Union Pacific Coal Company, *"D" Mine*, Superior, Wyo.
1938—The Union Pacific Coal Company, *"B" Mine*, Superior, Wyo.
1939—The Union Pacific Coal Company, *Winton No. 1 Mine*, Winton, Wyo.
1940—The Union Pacific Coal Company, *Rock Springs No. 4 Mine*, Rock Springs, Wyo.
1941—Electro Metallurgical Company, *Alloy No. 2 Mine*, Alloy, W.Va.
1942—Knife River Coal Company, *Knife River Mine*, Beulah, N. Dak.
1943—The Union Pacific Coal Company, *"D" Mine*, Superior, Wyo.
1944—The Union Pacific Coal Company, *"D" Mine*, Superior, Wyo.
1945—Rockhill Coal Company, *Rockhill No. 5 Mine*, Robertsdale, Pa.
1946—Consolidated Coal Company, *Bankhead No. 2 Mine*, Bankhead, Ala.
1947—The Union Pacific Coal Company, *Winton No. 1 and 7½ Mine*, Winton, Wyo.
1948—The Union Pacific Coal Company, *Reliance No. 7 Mine*, Reliance, Wyo.
1949—The Union Pacific Coal Company, *Reliance No. 7 Mine*, Reliance, Wyo.
1950—The Union Pacific Coal Company, *Reliance No. 7 Mine*, Reliance, Wyo.
1951—The Union Pacific Coal Company, *Reliance No. 7 Mine*, Reliance, Wyo.
1952—Tennessee Coal and Iron Division, United States Steel Corporation, *Short Creek Mine*, Adamsville, Ala.
1953—The Union Pacific Coal Company, *Hanna No. 4-A Mine*, Hanna, Wyo.

METAL

1925—New York Mining Company, *New York Mine (zinc and lead)*, Picher, Okla.
1926—Federal Mining and Smelting Company, *Muncie Mine (zinc and lead)*, Baxter Springs, Kans.
1927—The Bristol Mining Company, *Bristol Mine (iron)*, Crystal Falls, Mich.
1928—Brule Mining Company, *Berkshire Mine (iron)*, Stambaugh, Mich.
1929—Brule Mining Company, *Berkshire Mine (iron)*, Stambaugh, Mich.
1930—Penn Iron Mining Company, *West Vulcan Mine*, Vulcan, Mich.
1931—Hanna Ore Mining Company, *Harold Mine*, Carson Lake, Minn.
1932—St. Joseph Lead Company, *Balmat Mine (lead, zinc, and pyrites)*, Balmat, N. Y.
1933—Tennessee Copper Company, *Burra Burra Mine*, Ducktown, Tenn.
1934—Penn Iron Mining Company, *East Vulcan Mine*, Vulcan, Mich.
1935—Vermillion Mining Company, *Zenith Mine (iron)*, Ely, Minn.
1936—Penn Iron Mining Company, *East Vulcan Mine*, Vulcan, Mich.
1937—M. A. Hanna Company, *Hiawatha No. 1 Mine (iron)*, Iron River, Mich.
1938—Odanah Iron Company, *Cary Mine (iron)*, Hurley, Wis.
1939—M. A. Hanna Company, *Bates Mine (iron)*, Iron River, Mich.
1940—Phelps-Dodge Corporation, *Humboldt Mine*, Morenci, Ariz.
1941—American Zinc Company of Tennessee, *Grasselli Mine (zinc sulphide)*, New Market, Tenn.
1942—Tennessee Copper Company, *Boyd Mine*, Ducktown, Tenn.
1943—Penn Iron Mining Company, *East Vulcan Mine*, Vulcan, Mich.
1944—Youngstown Mines Corporation, *Newport Mine (iron)*, Ironwood, Mich.
1945—James Mining Company, *James Mine (iron)*, Iron River, Mich.
1946—Tennessee Copper Company, *Burra Burra Copper Mine*, Ducktown, Tenn.
1947—Oliver Iron Mining Company, *Soudan Mine*, Soudan, Minn.
1948—Oliver Iron Mining Company, *Fraser Mine*, Fraser, Minn.
1949—American Zinc Company of Tennessee, *No. 2 Mine*, Mascot, Tenn.
1950—Republic Steel Corporation, *Tobin Mine*, Crystal Falls, Mich.
1951—Oliver Iron Mining Company, *Soudan Mine*, Soudan, Minn.
1952—The Verona Mining Company, Pickands Mather & Company, *Buck Mine*, Caspian, Mich.
1953—Tennessee Copper Company, *Calloway-Mary Mine*, Ducktown, Tenn.

NONMETALLIC

1925—United States Gypsum Company, *Lower Gypsum Mine*, Gypsum, Ohio.
1926—The Beaver Products Company, Inc., *Grand Rapids Mine (gypsum)*, Grand Rapids, Mich.
1927—The Marquette Cement Manufacturing Company, *La Salle Mine (limestone)*, Oglesby, Ill.
1928—Alpha Portland Cement Company, *Ironton Mine (limestone)*, Ironton, Ohio.
1929—Retsof Mining Company, *Retsof Mine (rock salt)*, Retsof, N. Y.
1930—United States Gypsum Company, *Lower Gypsum Mine*, Gypsum, Ohio.
1931—Retsof Mining Company, *Retsof Mine (rock salt)*, Retsof, N. Y.
1932—Retsof Mining Company, *Retsof Mine (rock salt)*, Retsof, N. Y.
1933—Retsof Mining Company, *Retsof Mine (rock salt)*, Retsof, N. Y.
1934—The Marquette Cement Manufacturing Company, *La Salle Mine (limestone)*, Oglesby, Ill.
1935—Certain-teed Products Corporation, *Gypsum Mine*, Akron, N. Y.
1936—Tennessee Coal, Iron & Railroad Company, *No. 5 Mine (limestone)*, *Bessemer, Ala.*
1937—Tennessee Coal, Iron & Railroad Company, *No. 5 Mine (limestone)*, Bessemer, Ala.
1938—Avery Salt Company, Avery Island, La.
1939—Tennessee Coal, Iron & Railroad Company, *No. 5 Mine (limestone)*, Bessemer, Ala.
1940—Tennessee Coal, Iron & Railroad Company, *No. 5 Mine (limestone)*, Bessemer, Ala.

1941—United States Gypsum Company, *No. 6 Mine (gypsum)*, Plasterco, Va.
1942—Alpha Portland Cement Company, *Ironton Mine (limestone)*, Ironton, Ohio.
1943—United States Gypsum Company, *No. 6 Mine (gypsum)*, Plasterco, Va.
1944—National Gypsum Company, *Akron Gypsum Mine*, Akron, N. Y.
1945—Freeport Brick Company, *Freeport Mine (clay)*, Freeport, Pa.
1946—Certain-teed Products Corporation, *Acme Gypsum Mine*, Acme, Texas.
1947—Tennessee Coal, Iron & Railroad Company, *No. 5 Mine (limestone)*, Bessemer, Ala.
1948—Alpha Portland Cement Company, *Ironton Mine*, Ironton, Ohio.
1949—National Gypsum Company, *Bellefonte Mine*, Bellefonte, Pa.
1950—Pittsburgh Plate Glass Company, *Barberton Limestone Mine*, Barberton, Ohio.
1951—International Salt Company, *Retsof Mine*, Retsof, N. Y.
1952—Michigan Limestone Division, United States Steel Corporation, *Annandale Mine (limestone)*, Boyers, Pa.
1953—Michigan Limestone Division, United States Steel Corporation, *Annandale Mine (limestone), Boyers, Pa.*

OPEN-PIT AND QUARRIES

1925—North American Cement Corporation, *Security Quarry (limestone)*, Security, Md.
1926—North American Cement Corporation, *No. 5 and 6 Quarry (limestone)*, Martinsburg, W. Va.
1927—Lehigh Portland Cement Company, *Mitchell Quarry (limestone)*, Mitchell, Ind.
1928—Wakefield Iron Company, *Wakefield Open-pit Mine (iron)*, Wakefield, Mich.
1929—Michigan Limestone & Chemical Company, *Rogers City Quarry (limestone)*, Rogers City, Mich.
1930—Plymouth Mining Company, *Plymouth Open-pit (iron)*, Wakefield, Mich.
1931—Mahoning Ore & Steel Company, *Mahoning Open-pit Mine (iron), Hibbing, Minn.*
1932—Michigan Limestone & Chemical Company, *Rogers City Quarry (limestone)*, Rogers City, Mich.
1933—Michigan Limestone & Chemical Company, *Rogers City Quarry (limestone)*, Rogers City, Mich.
1934—Michigan Limestone & Chemical Company, *Rogers City Quarry (limestone)*, Rogers City, Mich.
1935—Folsom State Prison, *Granite Quarry*, Folsom, Calif.
1936—Hanna Ore Mining Company, *Mesabi Chief Mine (iron)*, Keewatin, Minn.
1937—Illinois State Penitentiary, *Limestone Quarry*, Menard, Ill. (Separated into Individual Groups in 1938.)

OPEN-PIT

1938—Pickands Mather & Company, *Mahoning Mine (iron-ore)*, Hibbing, Minn.
1939—Pickands Mather & Company, *Scranton Mine (iron-ore)*, Hibbing, Minn.
1940—Pickands Mather & Company, *Mahoning Mine (iron-ore)*, Hibbing, Minn.
1941—Pickands Mather & Company, *Mahoning Mine (iron-ore)*, Hibbing, Minn.
1942—Pickands Mather & Company, *Mahoning Mine*, Hibbing, Minn.
1943—Pickands Mather & Company, *Danube Mine*, Bovey, Minn.
1944—Pickands Mather & Company, *Danube Mine*, Bovey, Minn.
1945—Pickands Mather & Company, *Mahoning Mine*, Hibbing, Minn.
1946—Oliver Iron Mining Company, *Rouchleau Iron-ore Pit*, Virginia, Minn.
1947—Pickands Mather & Company, *Mahoning Mine*, Hibbing, Minn.
1948—Oliver Iron Mining Company, *Spruce Open-cut Mine*, Eveleth, Minn.
1949—Pickands Mather & Company, *Embarrass Mine*, Biwabik, Minn.
1950—Pickands Mather & Company, *Embarrass Mine*, Biwabik, Minn.
1951—Oliver Iron Mining Company, *Mt. Iron Mine*, Mt. Iron, Minn.
1952—International Minerals and Chemical Corporation, *Noralyn Mine*, Bartow, Fla.
1953—Pickands Mather & Company, *Mahoning Mine*, Hibbing, Minn.

QUARRIES

1938—Inland Lime & Stone Company, *Port Inland Quarry (limestone)*, Manistique, Mich.
1939—Inland Lime & Stone Company, *Port Inland Quarry (limestone)*, Manistique, Mich.
1940—Tennessee Coal, Iron & Railroad Company, *Dolonah Quarry (dolomite)*, Bessemer, Ala.
1941—Tennessee Coal, Iron & Railroad Company, *Dolonah Quarry (dolomite)*, Bessemer, Ala.
1942—Bethlehem Steel Company, *Hanover Quarry*, Hanover, Pa.
1943—Wyandotte Chemicals Corporation, *Alpena Quarry*, Alpena, Mich.
1944—Basic Refractories, Inc., *Maple Grove Quarry (dolomite)*, Maple Grove, Ohio.
1945—Bethlehem Steel Company, *Bridgeport Quarry (limestone)*, Bridgeport, Pa.
1946—Bethlehem Steel Company, *Bridgeport Quarry (limestone)*, Bridgeport, Pa.
1947—Tennessee Coal, Iron & Railroad Company, *Dolonah Quarry (dolomite)*, Bessemer, Ala.
1948—Bethlehem Steel Company, *Hanover Quarry*, Hanover, Pa.
1949—Tennessee Coal, Iron & Railroad Company, *Dolonah Quarry (dolomite)*, Bessemer, Ala.
1950—Michigan Limestone & Chemical Company, *Rogers City Quarry (limestone)*, Rogers City, Mich.
1951—Inland Lime & Stone Company, *Port Inland Quarry (limestone)*, Gulliver, Mich.
1952—Michigan Limestone Division, United States Steel Corporation, *Hillsville Quarry (limestone)*, Hillsville, Pa.
1953—Wyandotte Chemicals Corporation, *Alpena Quarry*, Alpena, Mich.

Awards of Certificates of Achievement in Safety

The rules of the competition provide for the award of Certificates of Achievement in Safety to each mine or quarry, other than the trophy winners, whose position in the contest was among the first four in their respective groups. Certificates are also awarded to each injury-free mine or quarry that worked 30,000 or more man-hours during the 12 consecutive months of each contest. The winners of Certificates of Achievement in Safety, in the National Safety Competition of 1953, are as follows:

ANTHRACITE MINES

Pine Ridge mine, Wilkes-Barre (Miners Mills), Luzerne County, Pennsylvania, operated by The Hudson Coal Company, worked 380,640 man-hours with 7 disabling injuries that caused 190 days of disability. The injury-severity rate was 0.499.

Gravity Slope mine, Archbald, Lackawanna County, Pennsylvania, operated by The Hudson Coal Company, worked 132,586 man-hours with 4 disabling injuries that caused 67 days of disability. The injury-severity rate was 0.505.

Loree-Boston mine, Plymouth, Luzerne County, Pennsylvania, operated by The Hudson Coal Company, worked 397,565 man-hours with 12 disabling injuries that caused 264 days of disability. The injury-severity rate was 0.664.

Loree No. 3 mine, Plymouth, Luzerne County, Pennsylvania, operated by The Hudson Coal Company, worked 457,908 man-hours with 19 disabling injuries that caused 317 days of disability. The injury-severity rate was 0.692.

BITUMINOUS-COAL MINES

Reliance No. 7 mine, Reliance, Sweetwater County, Wyoming, operated by The Union Pacific Coal Company, worked 298,321 man-hours without a disabling injury.

Rock Springs No. 8 mine, Rock Springs, Sweetwater County, Wyoming, operated by The Union Pacific Coal Company, worked 134,970 man-hours without a disabling injury.

Thacker mine, Williamson, West Virginia, Pike County, Kentucky, operated by Pond Creek Colliery of the Norfolk and Western Railway Company, worked 89,696 man-hours without a disabling injury.

Freeport mine, Williamson, West Virginia, Pike County, Kentucky, operated by Pond Creek Colliery of the Norfolk and Western Railway Company, worked 55,592 man-hours without a disabling injury.

Hernshaw mine, Hernshaw, Fayette County, West Virginia, operated by Electro Metallurgical Company, worked 36,509 man-hours without a disabling injury.

METAL MINES

James iron-ore mine, Iron River, Iron County, Michigan, operated by Pickands Mather & Company (James Mining Com-

pany), worked 140,411 man-hours without a disabling injury.

Davidson iron-ore mine, Iron River, Iron County, Michigan, operated by Pickands Mather & Company (Western Mining Company), worked 122,753 man-hours without a disabling injury.

Spruce underground iron-ore mine, Eveleth, St. Louis County, Minnesota, operated by Oliver Iron Mining Division of the United States Steel Corporation, worked 106,744 man-hours without a disabling injury.

North Friends Station zinc sulphide in dolomite limestone mine, New Market, Jefferson County, Tennessee, operated by American Zinc Company of Tennessee, worked 56,415 man-hours without a disabling injury.

Bennett underground iron-ore mine, Keewatin, Itasca County, Minnesota, operated by Pickands Mather & Company (Bennett Mining Company), worked 30,543 man-hours without a disabling injury.

NONMETALLIC MINES

Plant No. 9 limestone mine, West Winfield, Butler County, Pennsylvania, operated by Penn-Dixie Cement Corporation, worked 290,935 man-hours without a disabling injury.

Sugar Creek limestone mine, Sugar Creek, Jackson County, Missouri, operated by Missouri Portland Cement Company, worked 175,702 man-hours without a disabling injury.

Kimballton limestone mine, Kimballton, Giles County, Virginia, operated by The Standard Lime and Stone Company, worked 156,818 man-hours without a disabling injury.

Bakerton limestone mine, Bakerton, Jefferson County, West Virginia, operated by The Standard Lime and Stone Company, worked 152,088 man-hours without a disabling injury.

Crystal City sand mine, Crystal City, Jefferson County, Missouri, operated by Pittsburgh Plate Glass Company, worked 84,794 man-hours without a disabling injury.

Jonathon limestone mine, East Fultonham, Muskingum County, Ohio, operated by Columbia Cement Division of the Pittsburgh Plate Glass Company, worked 66,353 man-hours without a disabling injury.

OPEN-PIT MINES

Morton iron-ore mine, Hibbing, St. Louis County, Minnesota, operated by The M. A. Hanna Company (Morton Ore Company), worked 364,003 man-hours without a disabling injury.

Carmi-Carson Lake iron-ore mine, Hibbing, St. Louis County, Minnesota, operated by Pickands Mather & Company (Utica Mining Company), worked 345,744 man-hours without a disabling injury.

Portsmouth iron-ore mine, Crosby, Crow Wing County, Minnesota, operated by The M. A. Hanna Company (Hanna Iron Ore Company), worked 298,195 man-hours without a disabling injury.

Mahnomen iron-ore mine, Crosby, Crow Wing County, Minnesota, operated by Pickands Mather & Company (Cuyuna Ore Company), worked 277,959 man-hours without a disabling injury.

Corsica iron-ore mine, Elcor, St. Louis County, Minnesota, operated by Pickands Mather & Company (Corsica Iron Company), worked 269,129 man-hours without a disabling injury.

Douglas iron-ore mine, Chisholm, St. Louis County, Minnesota, operated by The M. A. Hanna Company (Douglas Mining Company), worked 268,953 man-hours without a disabling injury.

Plymouth iron-ore mine, Wakefield, Gogebic County, Michigan, operated by Pickands Mather & Company (Plymouth Mining Company), worked 222,281 man-hours without a disabling injury.

Sagamore iron-ore mine, Riverton, Crow Wing County, Minnesota, operated by Pickands Mather & Company (Sagamore Ore Mining Company), worked 176,998 man-hours without a disabling injury.

Longyear iron-ore mine, Hibbing, St. Louis County, Minnesota, operated by Minnesota Ore Division of the Jones & Laughlin Steel Corporation, worked 175,182 man-hours without a disabling injury.

Columbia iron-ore mine, Virginia, St. Louis County, Minnesota, operated by Minnesota Ore Division of the Jones & Laughlin Steel Corporation, worked 157,127 man-hours without a disabling injury.

Albany iron-ore mine, Hibbing, St. Louis County, Minnesota, operated by Pickands Mather & Company (Crete Mining Company), worked 154,162 man-hours without a disabling injury.

Fayal open-pit iron-ore mine, Eveleth, St. Louis County, Minnesota, operated by Oliver Iron Mining Division of the United States Steel Corporation, worked 117,130 man-hours without a disabling injury.

Morris open-pit iron-ore mine, Hibbing, St. Louis County, Minnesota, operated by Oliver Iron Mining Division of the United States Steel Corporation, worked 116,608 man-hours without a disabling injury.

Rabbit Lake iron-ore mine, Crosby, Crow Wing County, Minnesota, operated by Pickands Mather & Company (Youngstown Mine Corporation), worked 109,098 man-hours without a disabling injury.

Achan phosphate mine, Mulberry, Polk County, Florida, operated by International Minerals and Chemical Corporation, worked 84,393 man-hours without a disabling injury.

Columbia phosphate mine, Columbia, Maury County, Tennessee, operated by Monsanto Chemical Company, worked 67,172 man-hours without a disabling injury.

Klondyke kaolin mine, McIntyre, Wilkinson County, Georgia, operated by Edgar Brothers Company, worked 66,055 man-hours without a disabling injury.

Bonny Lake phosphate mine, Bartow, Polk County, Florida, operated by The Davison Chemical Corporation, worked 56,896 man-hours without a disabling injury.

Old Forge anthracite mine, Old Forge, Lackawanna County, Pennsylvania, operated by Lackawanna Mining & Construction Company, worked 51,200 man-hours without a disabling injury.

Osage bituminous-coal mine, Steamboat Springs, Routt County, Colorado, operated by Osage Coal Company, worked 47,390 man-hours without a disabling injury.

Richmond iron-ore mine, Palmer, Marquette County, Michigan, operated by Richmond Iron Company (The M. A. Hanna Company), worked 43,686 man-hours without a disabling injury.

Volunteer iron-ore mine, Palmer, Marquette County, Michigan, operated by Pickands Mather & Company (Palmer Mining Company), worked 42,439 man-hours without a disabling injury.

Spring Valley iron-ore mine, Ostrander, Fillmore County, Minnesota, operated by The M. A. Hanna Company (Hanna Coal and Ore Corporation), worked 35,772 man-hours without a disabling injury.

St. Clair anthracite mine, St. Clair, Schuylkill County, Pennsylvania, operated by The St. Clair Coal Company, worked 34,169 man-hours without a disabling injury.

Iron Mountain iron-ore mine, Iron Mountain, St. Francois County, Missouri, operated by The M. A. Hanna Company (Ozark Ore Company), worked 33,434 man-hours without a disabling injury.

Rockhill No. 11 bituminous-coal mine, Wood, Huntingdon County, Pennsylvania, operated by Rockhill Coal Company, worked 32,812 man-hours without a disabling injury.

Washington County kaolin mine, Sandersville, Washington County, Georgia, operated by Edgar Brothers Company, worked 31,593 man-hours without a disabling injury.

QUARRIES

Victorville limestone quarry, Victorville, San Bernardino County, California, operated by Southwestern Portland Cement Company, worked 267,962 man-hours without a disabling injury.

Permanente limestone quarry, Permanente, Santa Clara County, California, operated by Permanente Cement Company, worked 244,060 man-hours without a disabling injury.

Moler dolomite quarry, Millville, Jefferson County, West Virginia, operated by Michigan Limestone Division of the United States Steel Corporation, worked 242,219 man-hours without a disabling injury.

Plant No. 4 argillaceous limestone quarry, Nazareth, Northampton County, Pennsylvania, operated by Penn-Dixie Cement Corporation, worked 200,735 man-hours without a disabling injury.

Greystone crushed stone quarry, Henderson, Vance County, North Carolina, operated by Greystone Granite Quarries, Incorporated, worked 190,859 man-hours without a disabling injury.

Bailey Falls limestone quarry, Oglesby, LaSalle County, Illinois, operated by Marquette Cement Manufacturing Company, worked 184,044 man-hours without a disabling injury.

Fort Bellefontaine limestone quarry, St. Louis, St. Louis County, Missouri, operated by Missouri Portland Cement Company, worked 176,707 man-hours without a disabling injury.

Louisville limestone quarry, Louisville, Cass County, Nebraska, operated by Ash Grove Lime & Portland Cement Company, worked 159,712 man-hours without a disabling injury.

Red Hill granite quarry, North Garden, Albemarle County, Virginia, operated by Superior Stone Company, worked 135,772 man-hours without a disabling injury.

White Haven sandstone quarry, White Haven, Luzerne County, Pennsylvania, operated by The General Crushed Stone Company, worked 128,629 man-hours without a disabling injury.

St. Stephens limestone quarry, St. Stephens, Washington County, Alabama, operated by Lone Star Cement Corporation, worked 125,094 man-hours without a disabling injury.

Lawrence limestone and shale quarry, Ada, Pontotoc County, Oklahoma, operated by Ideal Cement Company, worked 124,536 man-hours without a disabling injury.

Dixon limestone quarry, Dixon, Lee County, Illinois, operated by Medusa Portland Cement Company, worked 122,769 man-hours without a disabling injury.

Bakers trapstone quarry, Monroe, Union County, North Carolina, operated by Superior Stone Company, worked 121,813 man-hours without a disabling injury.

Jensen limestone quarry, Riverside, Riverside County, California, operated by Riverside Cement Company, worked 120,113 man-hours without a disabling injury.

Millville limestone quarry, Harpers Ferry, Jefferson County, West Virginia, operated by Blair Limestone Division of the Jones & Laughlin Steel Corporation, worked 115,569 man-hours without a disabling injury.

Bedford limestone quarry, Bedford, Bedford County, Virginia, operated by Blue Ridge Stone Corporation, worked 111,136 man-hours without a disabling injury.

Earlham limestone quarry, Earlham, Madison County, Iowa, operated by Marquette Cement Manufacturing Company, worked 110,709 man-hours without a disabling injury.

Portland limestone quarry, Portland, Fremont County, Colorado, operated by Ideal Cement Company, worked 107,620 man-hours without a disabling injury.

Margerum asphaltic limestone quarry, Margerum, Colbert County, Alabama, operated by Alabama Asphaltic Limestone Company, worked 104,813 man-hours without a disabling injury.

Chanute limestone quarry, Chanute, Neosho County, Kansas, operated by Ash Grove Lime and Portland Cement Company, worked 104,436 man-hours without a disabling injury.

Galloway lime and rock quarry, Galloway, Greene County, Missouri, operated by Ash Grove Lime and Portland Cement Company, worked 102,015 man-hours without a disabling injury.

Lambertville traprock and crushed stone quarry, Lambertville, Hunterton County, New Jersey, operated by Kingston Trap Rock Company, worked 101,038 man-hours without a disabling injury.

Granite Canon ballast quarry, Granite Canon, Laramie County, Wyoming, operated by Morrison-Knudsen Company, Incorporated, worked 100,800 man-hours without a disabling injury.

Auburn limestone quarry, Auburn, Cuyuga County, New York, operated by The General Crushed Stone Company, worked 100,241 man-hours without a disabling injury.

Diamond limestone quarry, Middle Branch, Stark County, Ohio, operated by The Diamond Portland Cement Company, worked 98,390 man-hours without a disabling injury.

Keigley limestone and dolomite quarry, Payson, Utah County, Utah, operated by Columbia-Geneva Steel Division of the United States Steel Corporation, worked 95,955 man-hours without a disabling injury.

Bethlehem limestone quarry, Bethlehem, Northampton County, Pennsylvania, operated by Bethlehem Steel Company, worked 95,312 man-hours without a disabling injury.

Plant No. 2 limestone quarry, Clinchfield, Houston County, Georgia, operated by Penn-Dixie Cement Corporation, worked 94,303 man-hours without a disabling injury.

Nazareth cement rock quarry, Nazareth, Northampton County, Pennsylvania, operated by Lone Star Cement Corporation, worked 92,453 man-hours without a disabling injury.

No. 3 cement rock and limestone quarry, West Coplay, Lehigh County, Pennsylvania, operated by Coplay Cement Manufacturing Company, worked 91,495 man-hours without a disabling injury.

El Paso limestone quarry, El Paso, El Paso County, Texas, operated by Southwestern Portland Cement Company, worked 90,236 man-hours without a disabling injury.

Rock Hill traprock quarry, Quakertown, Bucks County, Pennsylvania, operated by The General Crushed Stone Company, worked 90,125 man-hours without a disabling injury.

Mason City limestone and shale quarry, Mason City, Cerro Gordo County, Iowa, operated by Lehigh Portland Cement Company, worked 87,589 man-hours without a disabling injury.

Paxton shale quarry, Paxton, Alpena County, Michigan, operated by Huron Portland Cement Company, worked 86,936 man-hours without a disabling injury.

Martins Creek limestone quarry, Martins Creek, Northampton County, Pennsylvania, operated by Alpha Portland Cement Company worked 85,555 man-hours without a disabling injury.

Plant No. 3 limestone quarry, Richard City, Marion County, Tennessee, operated by Penn-Dixie Cement Corporation, worked 85,360 man-hours without a disabling injury.

Oglesby limestone quarry, Oglesby, LaSalle County, Illinois, operated by Lehigh Portland Cement Company, worked 85,068 man-hours without a disabling injury.

Virginia limestone and shale quarry, Cloverdale, Botetourt County, Virginia, operated by Lone Star Cement Corporation, worked 83,644 man-hours without a disabling injury.

Watertown limestone quarry, Watertown, Jefferson County, New York, operated by The General Crushed Stone Company, worked 82,647 man-hours without a disabling injury.

York limestone quarry, York, York County, Pennsylvania, operated by National Gypsum Company, worked 82,600 man-hours without a disabling injury.

Nazareth limestone quarry, Nazareth, Northampton County, Pennsylvania, operated by Nazareth Cement Company, worked 82,560 man-hours without a disabling injury.

Cedar Hollow lime quarry, Devault, Chester County, Pennsylvania, operated by Warner Company, worked 82,064 man-hours without a disabling injury.

Northampton cement rock quarry, Northampton, Northampton County, Pennsylvania, operated by Universal Atlas Cement Company, worked 80,551 man-hours without a disabling injury.

Greencastle No. 2 crushed stone quarry, Greencastle, Putnam County, Indiana, operated by The Ohio & Indiana Stone Corporation, worked 80,424 man-hours without a disabling injury.

Natividad dolomite quarry, Salinas, Monterey County, California, operated by Kaiser Aluminum & Chemical Corporation, worked 76,960 man-hours without a disabling injury.

Inwood limestone quarry, Inwood, Berkeley County, West Virginia, operated by The J. E. Baker Company, worked 75,377 man-hours without a disabling injury.

Petoskey limestone quarry, Petoskey, Emmet County, Michigan, operated by Petoskey Portland Cement Company, worked 75,043 man-hours without a disabling injury.

Silica crushed stone quarry, Sylvania, Lucas County, Ohio, operated by Toledo Stone & Glass Sand Company, worked 75,000 man-hours without a disabling injury.

Jordanville limestone quarry, Jordanville, Herkimer County, New York, operated by The General Crushed Stone Company, worked 73,215 man-hours without a disabling injury.

La Salle limestone quarry, La Salle, La Salle County, Illinois, operated by Alpha Portland Cement Company, worked 72,999 man-hours without a disabling injury.

Mendota limestone quarry, Lilydale, Dakota County, Minnesota, operated by J. L. Shiely Company, worked 72,438 man-hours without a disabling injury.

Greencastle limestone quarry, Greencastle, Putnam County, Indiana, operated by Lone Star Cement Corporation, worked 72,389 man-hours without a disabling injury.

Dallas limestone and shale quarry, Dallas, Dallas County, Texas, operated by Lone Star Cement Corporation, worked 71,854 man-hours without a disabling injury.

Fordwick limestone and shale quarry, Fordwick, Augusta County, Virginia, operated by Lehigh Portland Cement Company, worked 71,495 man-hours without a disabling injury.

Kingston trap rock and crushed stone quarry, Kingston, Somerset County, New Jersey, operated by Kingston Trap Rock Company, worked 71,425 man-hours without a disabling injury.

Bonner Springs cement rock quarry, Bonner Springs, Wyandotte County, Kansas, operated by Lone Star Cement Corporation, worked 71,350 man-hours without a disabling injury.

Keystone cement rock quarry, Bath, Northampton County, Pennsylvania, operated by Keystone Portland Cement Company, worked 69,478 man-hours without a disabling injury.

Reliance "B" cement rock quarry, Egypt, Lehigh County, Pennsylvania, operated by Giant Portland Cement Company, worked 68,876 man-hours without a disabling injury.

Hercules cement rock quarry, Stockertown, Northampton County, Pennsylvania, operated by Hercules Cement Corporation, worked 68,806 man-hours without a disabling injury.

Union Bridge limestone quarry, Union Bridge, Frederick and Carroll Counties, Maryland, operated by Lehigh Portland Cement Company, worked 67,806 man-hours without a disabling injury.

New Braunfels limestone quarry, New Braunfels, Comal County, Texas, operated by United States Gypsum Company, worked 67,296 man-hours without a disabling injury.

Delta slate quarry, Delta, York County, Pennsylvania, operated by The Funkhouser Company, worked 66,800 man-hours without a disabling injury.

Birmingham limestone quarry, Birmingham, Jefferson County, Alabama, operated by Lone Star Cement Corporation, worked 65,124 man-hours without a disabling injury.

Birmingham limestone quarry, Tarrant, Jefferson County, Alabama, operated by Lehigh Portland Cement Company, worked 64,328 man-hours without a disabling injury.

Wampum limestone quarry, Wampum, Lawrence County, Pennsylvania, operated by Medusa Portland Cement Company, worked 63,776 man-hours without a disabling injury.

Fort Worth limestone quarry, Fort Worth, Tarrant County, Texas, operated by Trinity Portland Cement Division of the General Portland Cement Company, worked 63,679 man-hours without a disabling injury.

Sandt's Eddy cement rock quarry, Easton, Northampton County, Pennsylvania, operated by Lehigh Portland Cement Company, worked 62,837 man-hours without a disabling injury.

Holston limestone quarry, Mascot, Knox County, Tennessee, operated by American Limestone Company, worked 60,280 man-hours without a disabling injury.

Billmeyer dolomite quarry, Bainbridge, Lancaster County, Pennsylvania, operated by The J. E. Baker Company, worked 60,240 man-hours without a disabling injury.

Hudson limestone quarry, Hudson, Columbia County, New York, operated by Lone Star Cement Corporation, worked 60,048 man-hours without a disabling injury.

Farnams limestone quarry, Cheshire, Berkshire County, Massachusetts, operated by United States Gypsum Company, worked 59,849 man-hours without a disabling injury.

Sylvania limestone quarry, Sylvania, Lucas County, Ohio, operated by Medusa Portland Cement Company, worked 58,615 man-hours without a disabling injury.

Phillipsburg dolomite quarry, Phillipsburg, Montgomery County, Ohio, operated by The Laura Gravel & Stone Company, worked 57,000 man-hours without a disabling injury.

Joliet limestone quarry, Joliet, Will County, Illinois, operated by Lincoln Crushed Stone Company, worked 55,987 man-hours without a disabling injury.

Brodhead cement rock quarry, Brodhead, Northampton County, Pennsylvania, operated by National Portland Cement Company, worked 55,680 man-hours without a disabling injury.

Bellevue crushed stone quarry, Bellevue, Sandusky County, Ohio, operated by The France Stone Company, worked 54,885 man-hours without a disabling injury.

York dolomite quarry, York, York County, Pennsylvania, operated by The J. E. Baker Company, worked 54,200 man-hours without a disabling injury.

Ormrod limestone and cement stone quarry, Ormrod, Lehigh County, Pennsylvania, operated by Lehigh Portland Cement Company, worked 52,407 man-hours without a disabling injury.

Southwestern limestone quarry, Fairborn, Greene County, Ohio, operated by Southwestern Portland Cement Company, worked 52,026 man-hours without a disabling injury.

Boettcher limestone quarry, LaPorte, Larimer County, Colorado, operated by Ideal Cement Company, worked 49,612 man-hours without a disabling injury.

Lehigh limestone and brownstone shale quarry, Mitchell and Brownstown, Lawrence and Jackson Counties, Indiana, operated by Lehigh Portland Cement Company, worked 49,296 man-hours without a disabling injury.

Marquette limestone quarry, Cape Girardeau, Cape Girardeau County, Missouri, operated by Marquette Cement Manufacturing Company, worked 48,846 man-hours without a disabling injury.

St. Louis limestone quarry, St. Louis, St. Louis County, Missouri, operated by Alpha Portland Cement Company, worked 46,806 man-hours without a disabling injury.

Davenport limestone quarry, Davenport, Scott County, Iowa, operated by Dewey Portland Cement Company, worked 45,760 man-hours without a disabling injury.

National City gypsum rock quarry, National City, Josco County, Michigan, operated by National Gypsum Company, worked 45,515 man-hours without a disabling injury.

Superior limestone quarry, Superior, Jewell County, Kansas, operated by Ideal Cement Company, worked 45,230 man-hours without a disabling injury.

Bluffton crushed stone quarry, Bluffton, Wells County, Indiana, operated by The Erie Stone Company, worked 45,013 man-hours without a disabling injury.

(Asbury) Knoxville lime quarry, Knoxville, Knox County, Tennessee, operated by The Standard Lime and Stone Company, worked 44,784 man-hours without a disabling injury.

Evansville cement rock quarry, Evansville, Berks County, Pennsylvania, operated by Allentown Portland Cement Company, worked 43,509 man-hours without a disabling injury.

West Conshohocken cement quarry, West Conshohocken, Montgomery County, Pennsylvania, operated by Valley Forge Cement Company, worked 43,293 man-hours without a disabling injury.

San Juan limestone quarry, San Juan, San Benito County, California, operated by Ideal Cement Company, worked 42,724 man-hours without a disabling injury.

Martha limestone quarry, Martha, Wilson County, Tennessee, operated by Marquette Cement Manufacturing Company, worked 42,661 man-hours without a disabling injury.

Winterset limestone quarry, Winterset, Madison County, Iowa, operated by Penn-Dixie Cement Corporation, worked 42,305 man-hours without a disabling injury.

Stoughton traprock quarry, Stoughton, Norfolk County, Massachusetts, operated by Stoughton Crushed Stone Company, worked 42,120 man-hours without a disabling injury.

Prospect Stone Plant No. 6 limestone quarry, Prospect, Oneida County, New York, operated by Eastern Rock Products, Incorporated, worked 41,420 man-hours without a disabling injury.

Montgomeryville traprock quarry, Montgomeryville, Montgomery County, Pennsylvania, operated by Montgomery Stone Company, worked 40,500 man-hours without a disabling injury.

Iola limestone and shale quarry, Iola, Allen County, Kansas, operated by Lehigh Portland Cement Company, worked 39,554 man-hours without a disabling injury.

Thomasville crushed stone quarry, Thomasville, York County, Pennsylvania, operated by The J. E. Baker Company, worked 38,400 man-hours without a disabling injury.

Luckey limestone quarry, Luckey, Wood County, Ohio, operated by National Gypsum Company, worked 37,400 man-hours without a disabling injury.

Devil's Slide limestone quarry, Devil's Slide, Morgan County, Utah, operated by Ideal Cement Company, worked 36,729 man-hours without a disabling injury.

Fredonia limestone quarry, Fredonia, Wilson County, Kansas, operated by Consolidated Cement Corporation, worked 34,944 man-hours without a disabling injury.

Frazier limestone quarry, East Fultonham, Muskingum County, Ohio, operated by Columbia Cement Division of the Pittsburgh Plate Glass Company, worked 34,033 man-hours without a disabling injury.

Charmian roofing-granules quarry, Blue Ridge Summit, Franklin County, Pennsylvania, operated by The Funkhouser Company, worked 33,696 man-hours without a disabling injury.

Buffalo shale quarry, Buffalo, Erie County, New York, operated by Lehigh Portland Cement Company, worked 32,705 man-hours without a disabling injury.

Maryneal limestone quarry, Maryneal, Nolan County, Texas, operated by Lone Star Cement Corporation, worked 31,107 man-hours without a disabling injury.

Waukesha limestone quarry, Waukesha, Waukesha County, Wisconsin, operated by Waukesha Lime and Stone Company, worked 30,080 man-hours without a disabling injury.

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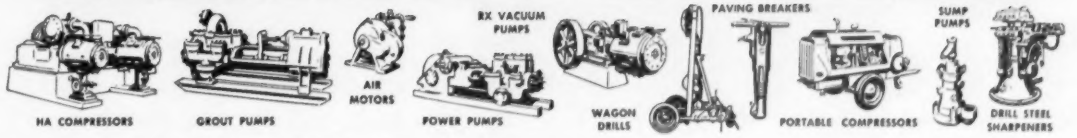

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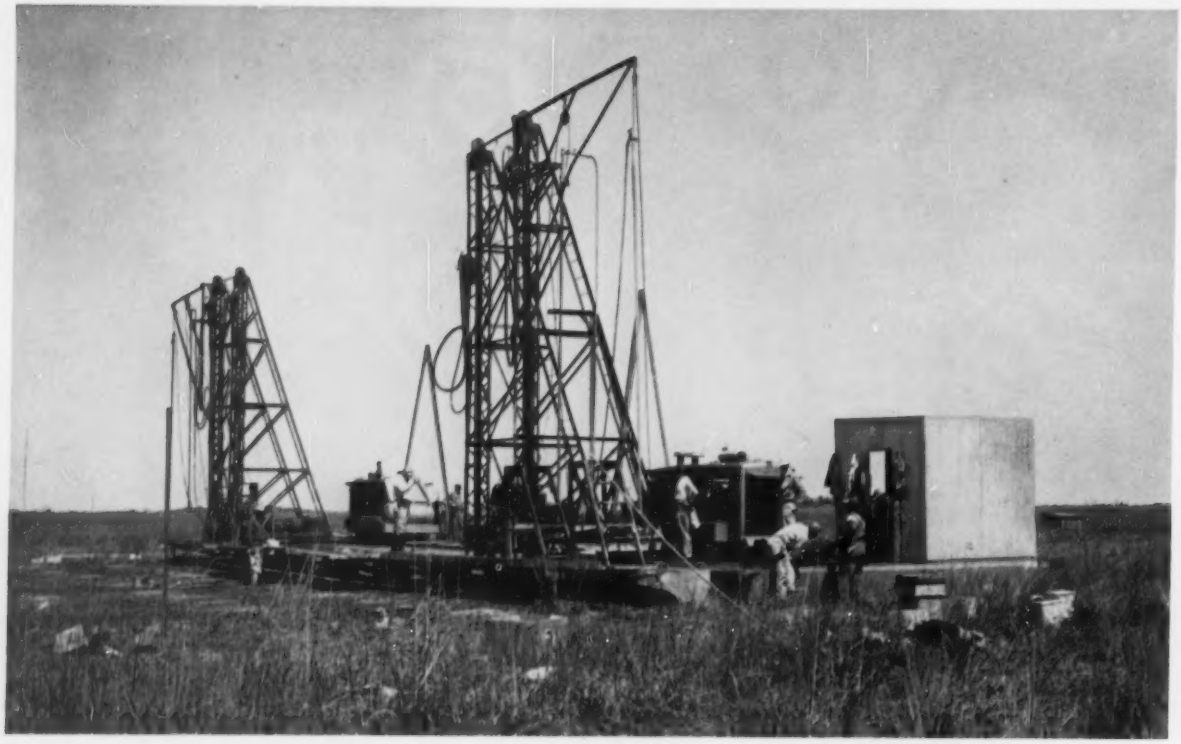

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Deep in the heart of Florida's Everglades, the Gahagan Construction Corporation of New York is engaged in drilling and blasting 2½ million cubic yards of coral rock. The rock lies in 16 miles of proposed drainage canals across the peat and semi-fluid waste land of the Everglades.

The contract covers part of a huge flood control and water conservation project that will consist of a series of levees and borrow pit drainage canals dividing the district into vast protected areas. An artificial lake 1500 square miles in area will be created which will be used to store excess flood waters until needed for irrigation and restoration of water levels during dry periods.

To drill 11 of the 16 miles of 90 foot canal under existing conditions required radical innovations in rock drilling equipment. A special all aluminum amphibious drill barge that can be towed through water and pulled overland was designed by Gahagan Construction Corporation to carry the compressors and drilling towers. The work is under the control of Jacksonville, Fla. District of the Corps of Engineers, U. S. Army.

Four Ingersoll-Rand X71-WD Drills were selected to do the drilling because of their high drilling speed and hole cleaning ability especially on deep holes. Two Ingersoll-Rand Gyro-Flo 600 cfm rotary compressors were chosen because of their light weight and ability to deliver high pressure air at full load.

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